

*Whitewater Canal Towpath Trail:
Creating a Greenway for Southeastern Indiana's
Historic Whitewater Canal*

An Honors Thesis (LA 404)

by

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May 2015

Expected Date of Graduation

May 2015

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ABSTRACT

Located in southeastern Indiana, the towns of Brookville and Metamora have been connected by canal and rail since the early 1800s. Built near the shallow Whitewater River, the Whitewater Canal was the first to provide a link for mass transportation of goods and people between the two towns. Susceptibility to both flooding and drought issues – as well as the inherently slow transport times via canal – led to the transition to rail. Track was laid along the old towpath and was first used for freight lines. As the need for freight decreased, this line was converted to an excursion rail line and is still in use today. It is this rich history and community connectivity that this project capitalizes on.

Research for this project included a review of relevant literature, study of existing similar projects, and observation of the site. This led to an investigation of historically and ecologically sensitive design opportunities along an 8.5-mile greenway that not only provides for connectivity and physical activity, but also integrates learning and education for community members, local schoolchildren, and visitors of all ages. By accentuating the natural and historic legacy of the canal, a design linking visitors to the local ecosystem and historic character of the corridor via an educational greenway has been created. Of special

importance are findings regarding natural restoration techniques, as this project sought not only to negate the impacts of the new greenway, but also the years of degradation to the natural ecosystem caused by the canal and rail line. By integrating natural restoration techniques with education and exercise opportunities, new information has been provided to the field of landscape architecture and to other communities with similar design possibilities.

ACKNOWLEDGEMENTS

I would like to first thank Chris Baas for his excellent advice and assistance in the development of this project. He has been not only a wonderful advisor and professor but also a great friend, and it has been my pleasure to take his classes during my five-year career at Ball State University.

I would also like to thank the faculty and staff in the Department of Landscape Architecture and the Honors College for a wonderful college experience, both inside the classroom and out.

Through my side through thick and thin have been Jeff, Kris, Shelby, Mitchell, Maria, Shea, and Emily. The support you give, in times of both laughter and tears, is invaluable.

Thank you.

[WHITEWATER CANAL TOWPATH TRAIL]

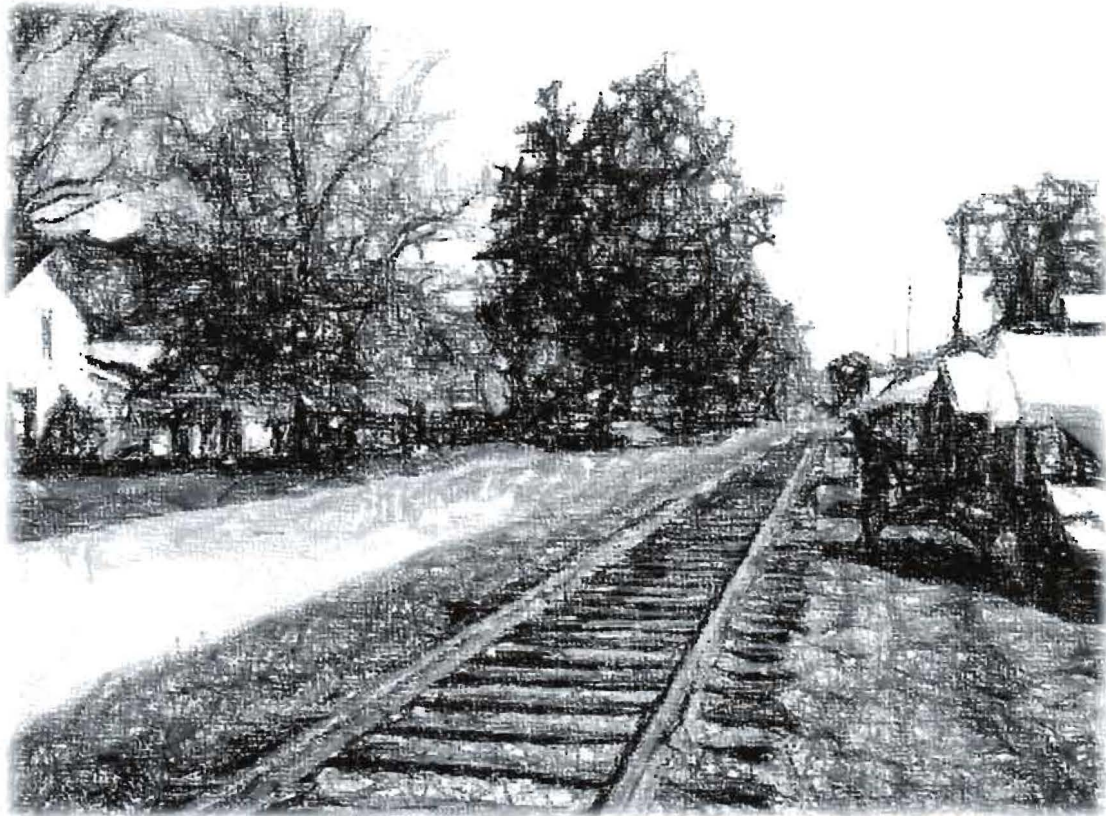
Creating a Greenway for Southeastern Indiana's Historic Whitewater Canal

Landscape Architecture
and Honors Thesis

By Kayla N. Lutz

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May 2015



ABSTRACT

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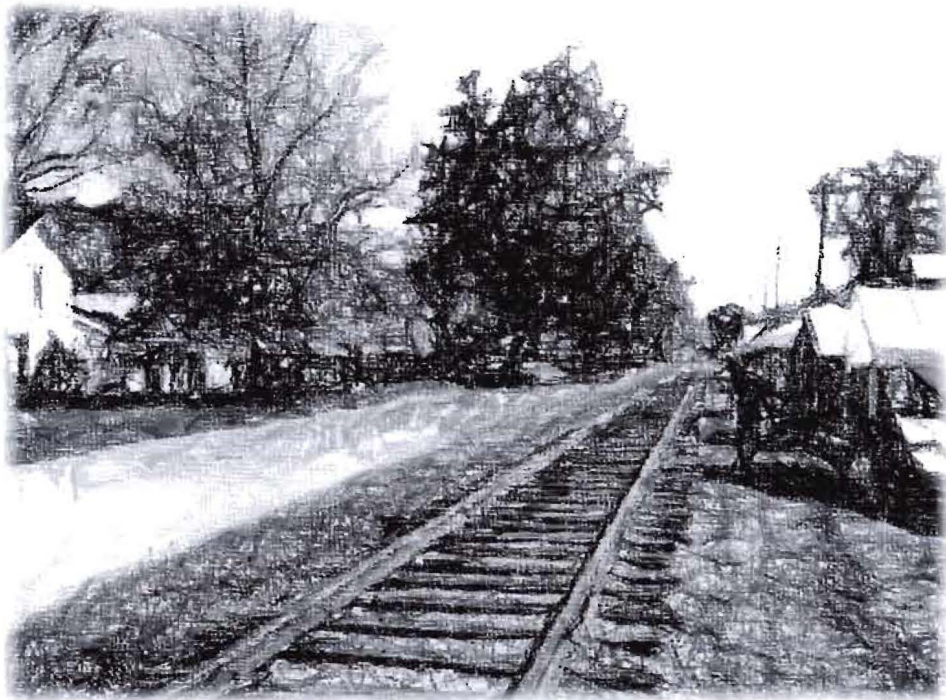
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Introduction

Literature Review



[INTRODUCTION]

Cultural landscapes are a legacy for everyone. These special sites reveal aspects of our country's origins and development as well as our evolving relationships with the natural world. They provide scenic, economic, ecological, social, recreational, and educational opportunities helping communities to better understand themselves.

The Cultural Landscape Foundation

The creation of a site which can not only connect a community to itself and other communities but also to the natural world has achieved what the above quote evokes. This is one of the most important overarching goals for the profession of landscape architecture. This project provides that experience for the residents and visitors of Brookville and Metamora, Indiana. It brings to light a solution in which both towns' cultural and natural legacies are proudly celebrated in a way that provides opportunities for learning, ecological sensitivity, and preservation of the site's unique character.

Brookville and Metamora are located in southeastern Indiana, surrounded by hills covered with native old-growth forests. The two towns are just over than seven and a half miles apart on US 52, but have no definable regional connection other than the two-lane state

highway. Reconnecting these two towns and developing a regional pedestrian connector for the area is a primary concern, as is strengthening the cultural link the towns already share. A sensitive solution provides an excellent case study for other communities in the region and will add to the existing knowledge base of the profession in terms of ecological restoration, greenway design, exercise trail design, and historic preservation.

LITERATURE REVIEW: INTRODUCTION

The Whitewater Canal Towpath Trail showcases a variety of design principles. Prior to design, many topics – including historic preservation techniques, natural restoration guidelines, and greenway programming – were researched in order to ensure that the quality of the final project was of the highest standard. A review of relevant literature was conducted to encourage new design thinking and to help expand the professional knowledge base of those looking into similar subjects. Literature investigated included information on subjects such as natural restoration, design techniques for rebuilding ecological stability, historic preservation and adaptive site reuse, education through the use of greenways and trails, exercise trail design, and design principles for greenways through case studies.

This research was conducted in a way as to be as tailored as possible. The breadth of topics helped to create a better design, while the number of pieces reviewed solidified this project into a well-founded example of a variety of design techniques. Meanwhile, the targeted research of specific aspects of the previously mentioned topics helped to create a body of reviewed knowledge that directly informed design for this particular site alone.

HISTORIC PRESERVATION

Throughout time, landscape architects and designers have been inspired by both history and designs of the past. A place's history – whether built or ecological – is integral in understanding not only what it has been, but what it can become. This research seeks to help expand the realm of knowledge in historically-based design through a careful and comprehensive review of existing literature. Techniques for utilizing the existing components and character of a site while adding new amenities have been presented, analyzed, and discussed in the following review.

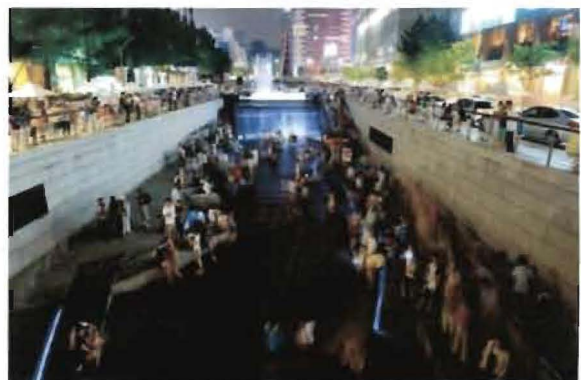
One of the greatest challenges designers face when adding new amenities to an historic site is maintenance of previous character. Many times, designers are tasked with adding a list of non-historic amenities to a protected site and must struggle with placement, materials, and the like in order to keep the historic context of the site alive and visible. This is particularly true of historic landscapes and protected outdoor sites. Michael Chiarappa and Kristin Szylvian, in their 2009 article entitled "Heeding the Landscape's Usable Past: Public History in the Service of a Working Waterfront" in *Buildings & Landscapes: Journal of the Vernacular Architecture Forum*, make the point that preserving historic character should not stand in the way of

keeping a site vibrant. Their research helps to fill a gap in the existing body of knowledge concerning how exactly to utilize a working waterfront as an active public space as well as for commerce and industry. They make the case that the best way for visitors to fully engage with the site is through interaction with and observation of it. This is often achieved through the use of trails and outdoor learning labs that utilize the space to its fullest extent. These methods give visitors an excellent feel for the site and helps history to come alive, much as they do on the Benton Harbor Waterfront Redevelopment plan that Chiarappa and Szylvian discuss, which remains a working waterfront in addition to retaining its historic character.

This is not to say that visitor interaction with an historic site is always a foregone conclusion. Some sites may not at first seem to be worth saving, much less celebrating. As Michael Conzen and Brian Wulfesteig point out in their 2001 article for the *Journal of Geography* entitled “Metropolitan Chicago’s Regional Cultural Park: Assessing the Development of the Illinois & Michigan Canal National Heritage Corridor,” lasting preservation goals often do not mesh well with new use goals. They point out that it may sometimes seem that the easiest solution is to tear down decrepit or decaying structures and to start fresh, regardless of historic value. Their

article is unique in encouraging designers to tackle projects that may at first seem unconventional. These sites are often the most impressive after everything is said and done; a site that is transformed from a neglected space or eyesore into a celebrated cultural anchor is always an interesting place to visit. However, Conzen and Wulfesteig do caution against allowing visitors to access every part of the site without restraint, warning that “...the more the historic fabric is made accessible, the more it is degraded” (Conzen and Wulfesteig, 115). This concept will be one that is heeded in the development of this project, as well-loved sites run the risk of lasting damage.

A variety of case studies investigated show varying levels of preservation of historic sites in the designs. Three will be reviewed in depth: the ChonGae Canal Restoration by MikYoung Kim Design, the Farmington Canal Greenway Interpretive Design by Dean Sakamoto Architects, and the Lafitte Greenway and Revitalization Corridor by Design Workshop, Inc. The ChonGae Canal Restoration



ChonGae Canal at Night, Seoul, South Korea: MikYoung Kim Design

project, completed in 2007, seems to have the least basis in historic preservation of the site, which resulted in a seven-mile green corridor with a central 2.25-acre urban plaza in Seoul, South Korea. The project did, however, create an excellent space for people to come together and to interact with an urban canal. MikYoung Kim Design terraced the plaza levels down into the water of the canal itself, allowing visitors to interact with the most historic part of this project on a visceral level. For the purposes of this project on the Whitewater Canal, the interaction with the water itself is a nice point to add, but a stronger interaction with history is desired by this designer.

The Farmington Canal Greenway Interpretive Design Project by Dean Sakamoto Architects comes closer to a historic preservation approach than does the ChonGae Canal Restoration. Built between 2008 and 2010, it pulls on a heritage of both canal and railway usage to establish the parameters for design and alignment. The signage created and placed along the trailway is located in historically significant places in order to better inform users of the historic nature of the site.



Farmington Canal Greenway: Connecticut/Massachusetts: DSA

Trail amenities along the length of the Greenway are made from historically-based materials indicative of the time period of the canal's heyday, though the Dean Sakamoto Architects' webpage mentioned little about the use of actual historic objects in the trail itself. The concept of linking the past to the present through the use of materials is of special importance in the development of this research, as it is a simple way to reinforce the feeling of the place to visitors while creating distinctive amenities.

The Lafitte Greenway and Revitalization Corridor by Design Workshop, Inc., though not yet built, comes the closest to meeting the preservation goals of this project. The historic location of the Carondelet Canal, which the Lafitte Corridor parallels, is to be marked by a mile-long bosque of bald cypress trees – a nod to the historic ecology of the cypress forest that would once have existed there and to the alignment of the canal. The historic placement of the railroad tracks will be marked by deliberate rust stains on the pavement of the trail. Again, little information is given about keeping larger remnants of the canal or rail line



Lafitte Greenway: New Orleans, LA: Design Workshop

trackage preserved if any exists, though the historic ecology of the site is well-served with the plantings of a variety of natives.

Historic preservation, while a challenge at times, can be rewarding and can provide an extremely strong core for a project's design. Some of the projects discussed in the proceeding paragraphs have had a more obvious connection to the historic characters of the sites that they existed in conjunction with. These are the types of projects that are emulated in the Whitewater Canal Towpath Trail. In particular, the use of historic materials, as reviewed in the Dean Sakamoto Architects-designed Farmington Canal Greenway, plays an important role in the development of this project as does the methods used to allow visitors to interact with water, as described in the ChonGae Canal Restoration project by MikYoung Kim Design. Also of particular interest are the methods outlined in Design Workshop, Inc.'s interpretation of the Lafitte Greenway and Revitalization Corridor for the implication of historic rights-of-way through the use of plant material and bosques of trees. As Michael Chiarappa and Kristin Szylvian pointed out in their discussion of the Benton Harbor Waterfront Redevelopment plan, "the historic fiber of the place's distinct uses, experiences, and building patterns" should work together to create a comprehensive plan for "informed

community engagement in matters relating to planning and preservation" (90).

NATURAL RESTORATION

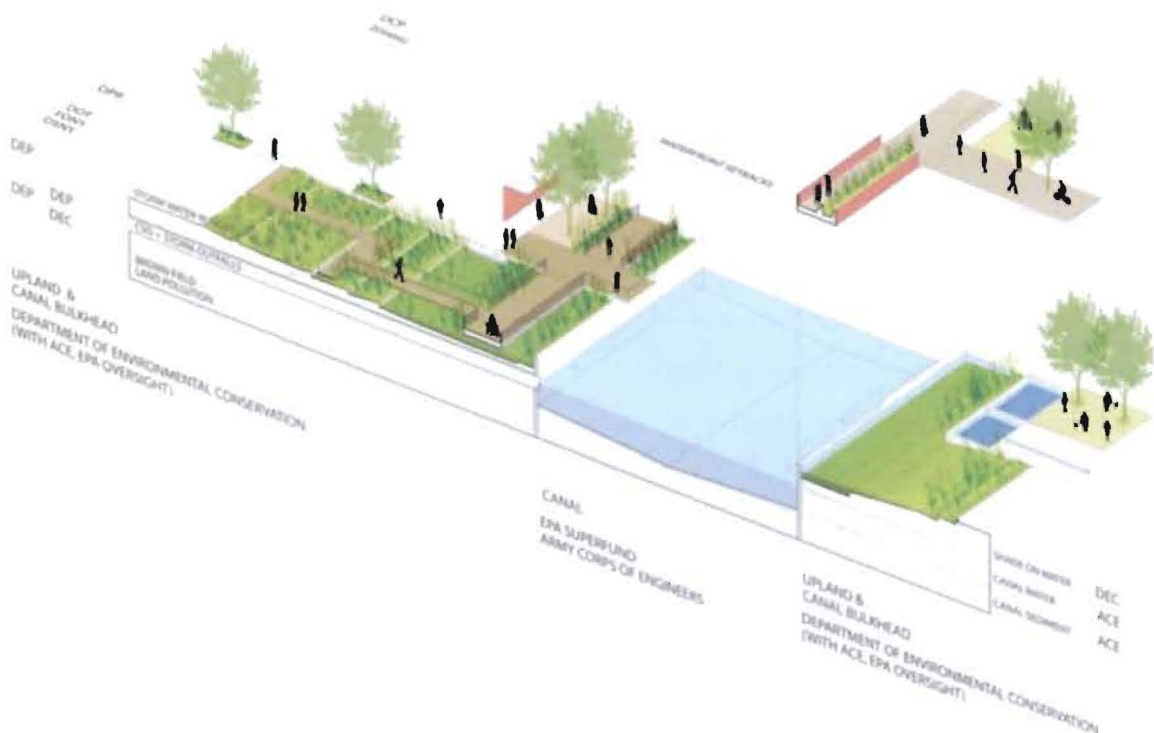
While house museums and historic structures certainly can be damaged by swarms of visitors traipsing through, outdoor sites can be harmed in countless other ways. Damage to micro-ecosystems is one of the largest concerns, especially with our society's penchant for the maintenance of trails and amenities with herbicides. Some of the most important elements in historic landscapes – the edges of vegetated areas and the feelings that those create – can be changed drastically or eradicated completely when exposed to years of such treatment. Similarly, native or historic plants can be killed off or damaged by too much foot traffic through a historic site, new exotics can be carried in on the clothing and shoes of visitors, and toxins and pollutants washed across the ground can change ecology. The reinstatement of native species and native ecology are of special importance to this author.

There are a variety of methodologies for the restoration of native habitat and species. One way to help overall ecosystem health is through water cleansing and infiltration. Susannah C. Drake and Yong Kim

provide a unique look at this subject in their 2011 article for *Ecological Restoration* entitled “Gowanus Canal Sponge Park™”. In the article, the team outlines the methodologies that they used in the creation of a proposed water infiltration and cleansing park near New York City’s Gowanus Canal. Their Sponge Park™ concept deals with the infiltration of water through a system of roadside bioswales, native plantings, and specially-designed structural soil before rejoining the water of the Gowanus Canal. This article provides excellent insight into the creation of a working water quality improvement system that can be located in a relatively small amount of space – a street end’s right-of-way – and that can be made interactive without damage to the ecological systems at

work. The methods used in the creation of bioswales full of native plants and boardwalks were of great use in the Whitewater Canal Towpath Trail project.

In direct response to Drake and Kim’s article mentioned above, Steven N. Handel wrote “Squeezing More Ecological Value from the Sponge Park™” for *Ecological Restoration* in 2011. In an interesting and valuable secondary analysis of the Sponge Park™ concept, Handel deals more directly with habitat creation than stormwater deceleration and filtration. In his article, Handel outlines the ways that a Sponge Park™ or similar site can maximize habitat while also increasing phytoremediation and visual beauty. Handel recommends the addition of a variety of shrub species to increase perching



and feeding habitat, as well as the variance of depth in water detention areas for wading birds in the area. He also critically asserts that careful calculations must be made to ensure that the small size of the parks can handle the full brunt of the surface runoff they are said to be able to receive. Though the Sponge Park™ was developed for a specific New York City ecological zone, the concepts that Handel brings out and accentuates are well-adapted to transfer to the Whitewater Canal Towpath Trail.

The concepts presented in Desiree D. Tullos' 2006 article for *Ecological Restoration* detail a completely different yet equally valuable approach. In "River Restoration in China: A Review of Local Efforts to Improve the Quality of Lotic Life," Tullos outlines the actual methodology for repairing degraded streambanks, canals, and riparian corridors. Her article fills an interesting gap in research on stream restoration, discussing how places – in the case of her article, China – can transition from large-scale river engineering projects that fracture local ecology to smaller, restorative designs that help to recreate ecological balance.



Section of Typical Brush Layer Technique Kayla Lutz

Tullos then details how the use of "live stakes, brush mattresses, and brush layers" can help to "stabilize the banks, reconnect rivers to their floodplains, and enhance natural riparian functions, including the filtration of nutrients" (Tullos, 169). The methods the article pointed out for revegetating streambanks were useful for the Whitewater Canal Towpath Trail project.

The methods pointed out in all three of the above articles provided invaluable information on how exactly to restore the natural riparian corridors along the Whitewater Canal Towpath Trail. However, one concern is that the restoration of degraded areas in the canal may eventually lead to the decomposition or obscuring of the canal itself. In other words, the historic structure of the canal needs to remain, at least in part, visible and accessible to visitors. Finding a balance between restoration and preservation was a major component of the design of the project. Of special importance to the design concept were the creation of bioswales along the proposed greenway trail in the same vein as the curbside swales mentioned in Gowanus Sponge Park™ project and the creation of better habitat as discussed in Handel's article. Similarly, the methods discussed by Tullos were applied, though with a light hand. The lure of having a healthy ecosystem, both in the canal and in the areas around it, will prove to be a strong one in enticing visitors to use the greenway.

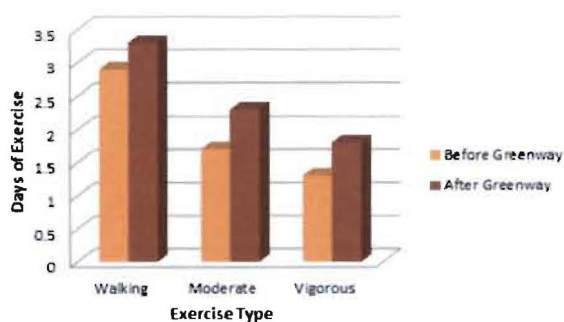
GREENWAY PROGRAMMING AND DESIGN

Greenway design, termed as such, seems to be a relatively young discipline, yet the concept has been around for much longer than the phrase. The central idea is to provide visitors with an easily accessible trailway that passes through a variety of beautiful and interesting places. Additionally, it can provide a wealth of other amenities ranging from trailside exercise equipment, nature education signage, historic event descriptions, or any number of other informative or useful features, as well as simply providing a safe route for biking, running, or walking. Many greenways capitalize on the provision of such features that are lacking in the communities they service, and often connect multiple communities to better create a regional collection of amenities.

One of the most interesting activities to program a greenway for is exercise, which can positively affect the lives of those community members around the area. This is the subject covered in Stephanie T. West and Kindal A. Shores' 2011 article for the *Journal of Physical Activity and Health*. The article, "The Impacts of Building a Greenway on Proximate Residents' Physical Activity," outlined the way greenways can affect a community's health as recorded through a series of statistics. The authors looked specifically at whether having a new greenway within half a mile of homes made

residents more likely to increase their physical activity than those residents living a half-mile to a mile away from the same new greenway. However, they found there to be little difference between the two groups of respondents. While the results of their findings were – within those parameters – inconclusive, West and Shores did report that most respondents, regardless of proximity to the greenway, did increase their physical activity levels once the new greenway was installed. They encourage the development of such projects, stating, "As such, it appears that the development of a greenway proximate to residents' homes is likely to have a positive effect on participation levels in walking and moderate activity" (West and Shores, 1095). They also state that this study should "provide optimism" for those community members and professionals with an interest in "improving the physical activity behaviors of their residents through environmental changes, such as the development of greenways near residential homes" (1096).

Change in Exercise with Addition of Greenways



Section of Typical Brush Layer Technique: Kayla Lutz

Another viewpoint on the efficacy of greenways in the encouragement of physical activity is that of Greg Lindsey. In 1999 his article “Use of Urban Greenways: Insights from Indianapolis” appeared in *Landscape and Urban Planning*. His article shows that while conventionally greenway usage studies have determined use numbers via location and trail characteristics for local users within 5 miles of the trail, new research has uncovered better methods. The best way, in the author’s opinion, is not to create usage numbers for whole trails, but for trail segments, as certain portions will necessarily be used more frequently than others. The article presents project sites in Indianapolis, the Monon Greenway, White River Greenway, and Towpath Trail for consideration. Survey results and user demographics are created from the synthesized data to determine usage patterns and support the greenways’ efficacy in encouraging exercise. As Lindsey finds, “More than 90% of users on each trail cited health and fitness as a reason for use; ≈ 70% of users on each trail cited outdoor leisure/nature” (Lindsey, section 10.1). For this project, the identification of components with the highest usage actually helps determine the best locations for trailside amenities and helps predict the usage on each portion of the proposed Whitewater Canal trail.

An excellent case study for the use of exercise trails is located about 45 minutes from the site of the proposed Whitewater Canal Towpath Trail. The Miami Whitewater Forest is a 4,345-acre park in Harrison, Ohio featuring a 1.2-mile fitness trail. Though the trail at Miami Whitewater is slightly dated now, it still provides an excellent fitness trail, the Shaker Trace Trail, with 18 fully-accessible stations featuring three levels of difficulty. One of the most important components of that system for this project is that all stations offer exercises for those who are wheelchair-bound as well as for able-bodied patrons. The park offers horseback riding and other trail forms as well. As the Miami Whitewater Forest website states, “Shaker Trace has two loops – a short 1.2 mile inner loop and the extended 7.8 mile outer loop... Along the way, you’ll see restored wetlands and prairie, as well as creek beds and farmland” (GreatParks.org). The incorporation of such a rich variety of habitats along a diverse collection of trails with various uses was of particular importance to this project.

Greenways can provide excellent educational opportunities as well, as evidenced in Rick Hall and Cheryl Bauer-Armstrong’s 2010 article for *Ecological Restoration* entitled “Earth Partnership for Schools: Ecological Restoration in Schools and Communities.” Their article discusses programs in local schools that allow children to experience the techniques and

benefits of natural restoration up close in their own schoolyards. The article brings to the table new insight on how the lives of the schoolchildren can be positively impacted through seeing the habitat creation and natural cleansing that restored areas can encourage. The authors point out that the link between the schools in the programs and the communities they draw from provides an excellent opportunity for learning for the children and community members alike. The article also outlines ways that the Earth Partnership program helps to connect land-based lessons to schoolwork in and out of the classroom, resulting in restored schoolyards created by the children. The strong basis in ecological education that these children receive helps to create a new generation of sustainably-minded, ecologically-conscious members of society. While this project does not have a schoolyard restoration component, it is easy to imagine a program similar to the Earth Partnership discussed here being applied to the Whitewater Canal Towpath Trail, in which different schools help restore and maintain certain sections of the trail.

The previous discussions of historic preservation integrity and natural restoration of the Whitewater Canal Towpath Trail will mean nothing if visitors are not engaged and able to access the site. The creation of a well-designed and attractive greenway, accessible at multiple

seasons and to a variety of users, was paramount to the success of this project as a whole. By utilizing the techniques for user interaction as seen in the Monon Greenway, White River Greenway, and Towpath Trail as discussed by Greg Lindsey, this project has achieved a higher level of success. The incorporation of education is also extremely important. Methods for integrating local schools' classwork into restoration projects, such as those described by Hall and Bauer-Armstrong, will increase the community's education about both the greenway and about the natural environment it celebrates.

CONCLUSION

The body of research reviewed here – though a substantial amount – represents only a fraction of the full volume of research available on any of the three given topics. The works reviewed, however, represent a comprehensive cross-section of the ideas prevalent in each of the topics, pulled from a variety of sources such as published books, professional journal and magazine articles, and professional websites. The synthesis and comparison of various techniques has provided valuable insight for how a project like the Whitewater Canal Towpath Trail can be approached.

Research conducted in historic preservation revealed an interesting division. The authors reviewed were split over the balance of preservation and new use, with merit to both sides of the argument. While preservation for its own sake is not necessarily detrimental, a site must remain accessible in some capacity in order to remain appreciated. This view was shared by MikYoung Kim Design, Dean Sakamoto Architects, and Design Workshop, Inc. as well as author team Chiarappa and Szylvian. All of these intellectuals encourage the use of historic sites for recreational and educational purposes. While authors Conzen and Wulfesteig also lauded the use of locations with historic value for these purposes, they also included a note of caution, warning that overuse can lead to degradation of the site's historic amenities.

Natural restoration research unearthed the same types of issues as did research into historic preservation. The authors discussed, however, all agreed on the value of restoration but varied in their methodology of how to restore natural areas. Author team Drake and Kim focused almost solely on the cleansing of stormwater and polluted runoff in their article, prompting a response from author Handel about the importance of wildlife habitat creation. Handel's article proved extremely useful as a supplement to Drake and Kim's, adding a level of depth missing from the original

analysis of the project's efficacy. The holistic design presented between the two articles creates a solid cross-section of the general findings of natural restoration research. Without Tullos' article on methodology, however, research on the subject would have been incomplete. Her description of techniques used to stabilize and restore damaged ecosystems neatly ties up the discussion of natural restoration methods and value.

Greenway design and programming are varied topics with many avenues for research. The findings of this investigation were conclusive on the value of greenways to communities they intersect. Both Lindsey and author pair West and Shores agreed, through scientific analysis of collected data, that greenways increased the physical activity levels of residents near trails. This critical information verifies that a project like the Whitewater Canal Towpath Trail has immediate and visceral benefit to the communities that will be in closest proximity to it, and may well be the ones helping to fund it. The Miami Whitewater Forest's Shaker Trace Trail provides additional evidence of the efficacy of fitness trails. Education components of greenway design, as reviewed in the authors Hall and Bauer-Armstrong's article on school partnerships also provides invaluable services to the community as a whole. The addition of educational programming helped to elevate the benefit of

the greenway to new levels, creating learning opportunities for the entire region.

The design of a site that showcases historic preservation, natural restoration, and programming such as fitness and education was not easy. The research detailed above, however, provided critical insight into the current views in the landscape architecture profession on the ability to utilize and derive value from all of these parts separately. The biggest challenge for this project was the synthesis of these concepts into a single cohesive whole that provided the best of all components – and without favoring one to the detriment of the other.

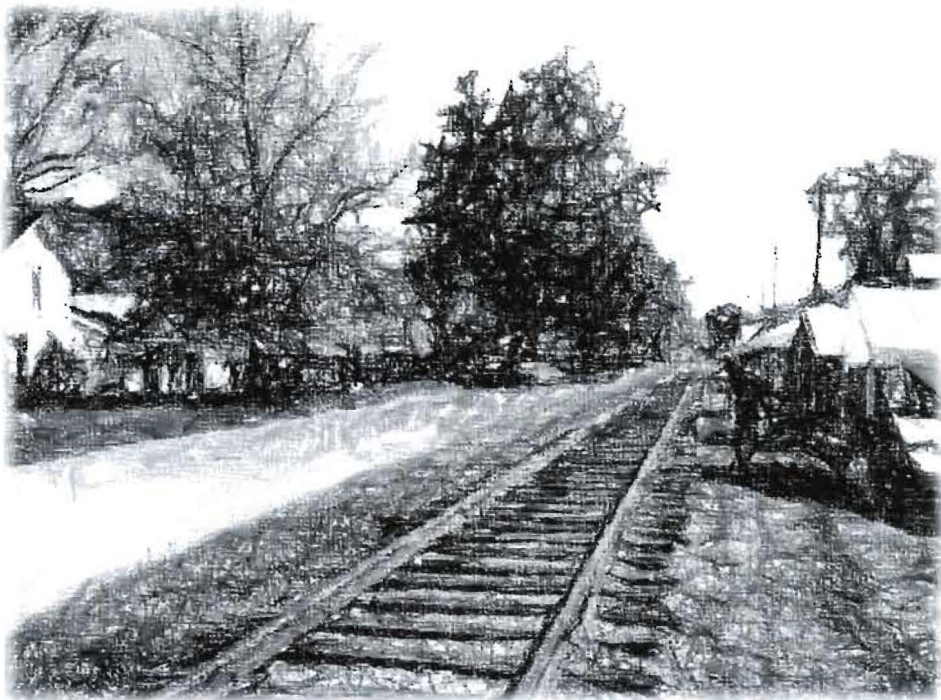
Problem Statement – Subproblems – Mission Statement

Hypotheses

Definitions

Assumptions – Delimitations

Statement of Significance



[BACKGROUND]

PROBLEM STATEMENT

This study investigated cultural and naturalized design opportunities for a heritage trail along the Whitewater Canal between the towns of Brookville and Metamora, Indiana. By accentuating the natural and historic legacy of the canal, a design linking both visitors and community members to the local ecosystem and historic character of the corridor via an educational greenway has resulted. A master plan for a new bicycle/pedestrian exercise path has been shown in detail, along with examples of the design language and site fixtures called for along an educational greenway of this scope.

MISSION STATEMENT

The mission of this project aimed to analyze methods for highlighting historic events and applied these methods to the creation of a user-friendly, educational greenway along the Whitewater Canal between the towns of Metamora and Brookville, Indiana. This greenway encourages physical activity in residents and visitors alike while simultaneously utilizing materials and signage to evoke the history of the canal. The greenway design also reestablishes local plant and animal communities to improve ecology and restore native populations on site.

SUBPROBLEMS

1. How can the design remain sensitive to native ecosystems and the historic character of the site even with increased visitor traffic?
2. What features of the greenway will encourage visitors to use the path as a connector, educational site, and exercise opportunity throughout the year?
3. How can the historic character of the canal best be showcased in signage, art, and small parks along the greenway?

HYPOTHESES

- Research has led to naturalization techniques that mitigate any existing ecological damage, whether from past or recent practices, along part of the Whitewater Canal and the surrounding areas. Naturalization can be done in a way that does not damage the historic character of the site but rather enhances it.
- Community members use the greenway as an additional connector and exercise corridor between the towns of Brookville and Metamora. This greenway also provides a valuable educational experience for visitors and residents.
- The character of the canal is showcased in the use of historic-looking materials in site fixtures such as benches, greenway lamps, signage, and art along the length of the site. Small parks and pull-offs highlight integral sites or concepts from the canal's history.

DEFINITIONS

Ecosystem: A community of both living and non-living things that exist via co-dependent relationships. Ecosystems can vary in size, and this project may reference various types of

ecosystems, such as hardwood forest systems, water systems, or meadow systems.

Exercise Trail: A path system that is specifically designed to promote use of key muscle groups. For this project, small parks along the trail may feature workout routine signage, or stops may be integrated on the trail itself.

Greenway: A path system that creates a corridor for travel and cultural connections which can be utilized by a variety of pedestrian or non-motorized means of transportation. These corridors often rely heavily on natural landscaping or plantings to enhance connections to nature.

Heritage Trail: A path system that integrates the legacy of both local and regional history into signage, and site fixtures so as to inform users about the past of the site.

Naturalization: The process of returning native plants and animals to areas affected by human habitation or infrastructure. This project will focus on naturalization more than restoration, due to the desire to maintain the historic nature of the site's human impacts at the canal.

Site Fixtures: Any amenity aside from the trail itself that lends to the overall message of the site. This includes but is not limited to: lighting fixtures, bicycle racks, benches, signs, exercise stations, and artwork or sculpture.

ASSUMPTIONS

It is assumed that:

- Funding exists for the proposed project.
- The project fills a void in multi-modal travel that the two communities share.
- All land required for the proposed design has been acquired.
- Proposed land naturalization techniques are necessary and had a positive effect on the site.

DELIMITATIONS

This project does not:

- Suggest sources of funding for the design.
- Provide engineering drawings or construction documents for the proposed design.
- Create a greenway system that extends past Brookville or Metamora, Indiana.
- Source the materials needed to construct this design.
- Develop planting plans for the project as a whole, though certain areas may have sample planting plans.
- Conduct detailed public surveys in the two communities.

STATEMENT OF SIGNIFICANCE

This project is significant because it has created a comprehensive master plan based on in-depth analysis and research for the area between Brookville and Metamora, Indiana. It addresses community needs while providing ample opportunities for visitors to experience local culture and history. Naturalization of the site has provided a beautiful corridor in which schoolchildren, residents, and visitors alike can learn about the Whitewater Canal and the ecological history of the southeastern Indiana landscape. This project has contributed to the existing professional knowledge base in landscape architecture and related fields through its application of naturalization techniques, greenway design, and ecological education methods.

The benefits of naturalization are varied. Naturalization of the site has led to increased water quality, increased infiltration amounts and reduced runoff, habitat restoration, improved species diversity, new educational opportunities, and increased usage of the greenway area. Preservation and redevelopment of natural landscapes leads to unique learning opportunities and can help preserve or recreate historic Indiana landscapes. Being in natural places helps encourage an appreciation for nature in wide audiences.

As local schools integrate the greenway into lesson plans, valuable information about the natural and cultural history of the region will become accessible to students in new ways. Field trips to the site can highlight ecosystems in the region, geologic processes, state history, transportation history, and native plant and animal appreciation. Adult residents and visitors alike have benefitted from the same categories of education, though at a more refined level. Local nature guides will lead leaf walks or plant identification classes along the greenway, while historians will hold canal talks. Historical reenactments could also be an interesting way to engage many ages of users.

Greenways provide excellent linkages between various regional points of interest, but even more importantly provide space for recreation and exercise. The greenway's incorporation of exercise stations or in-place workout suggestions helps to increase the vitality and health of the communities along the trail. Due to the greenway's unprogrammed nature, it is an excellent place for the whole family to remain active, with no age limitations or monetary investments. Biking, skateboarding, walking, jogging, and roller-blading are all activities which many people can participate in. Cross-country skiing in the winter will help to keep the greenway active all year long.

The significance to my education cannot be overstated. With this project, I have showcased the culmination of five years of work and dedication to not only my major program, landscape architecture, but also to my Honors college coursework and minor coursework in both historic preservation and sustainable land systems. By working through a project of my own design and by my own volition, I have truly proved my mettle as both a scholar and a designer.

Goals and Objectives

Program

Concerns and Considerations

Site Context

Inventory

Analysis



[SITE OVERVIEW]

GOALS AND OBJECTIVES

Goal: This project emphasizes the area's historic connection to the Whitewater Canal and Whitewater Valley Railroad.

- Objective 1: This has been accomplished through the incorporation of the canal and railway into the views and design of the greenway.
- Objective 2: This has been accomplished by using historic materials from the original canal, locks, dams, and railway and accenting them through the use of materials such as wood, rusticated metal, stainless steel, and painted metal to mimic historic materials in creative ways.
- Objective 3: This has been accomplished through the use of educational signage which will explain areas of historic interest to visitors.

Goal: This project provided a comprehensive, accessible exercise greenway between Metamora and Brookville, Indiana.

- Objective 1: This has been accomplished through redesigning and connecting existing trails to create one cohesive greenway.

- Objective 2: This has been accomplished by utilizing trailside exercise equipment for a variety of skill levels to create a holistic fitness experience for users of all skill levels.
- Objective 3: This has been accomplished by providing trailside amenities that encourage users to explore the whole greenway at their leisure.

Goal: This project has helped to rebuild damaged ecosystems and create new habitat in the area through natural restoration techniques.

- Objective 1: This has been accomplished through the reconnection of disrupted hydrologic flow and the cleansing of the canal water itself.
- Objective 2: This has been accomplished by using native plants at the greenway edges and replacing exotics and invasives within a 10'-0" radius of the impacted area for the length of the greenway.
- Objective 3: This has been accomplished through the stabilization of the canal banks and railway bed using low-impact and soft-scaping techniques.

PROGRAM

The design responds to the need for and provides the following:

- Bathrooms and fountains every 2 miles
- Shelters every two miles
- ½ -mile exercise trail at each terminus
- ¼ -mile history walk at each terminus
- Ecological and hydrological connections restored
- Ecological buffer around trail to mitigate and cleanse runoff
- Incorporate birding habitat – nest sites, duck and goose boxes
- ADA-accessible entrances to trail and historic sites
- Add two more trail-heads on US 52
- Public access for:
 - Gordon's Lock
 - Twin Locks
 - Lock #23
 - River vistas
 - Yellow Bank Aqueduct & Bridge
 - Duck Creek Aqueduct

DESIGN CONCERNS AND CONSIDERATIONS

1. **Concern:** With additional visitors to the site each year, historic structures may be in jeopardy from vandalism or overuse.

Consideration: Encouraging visitors through signage to look but not touch will help, as could the potential installation of cameras near important historic sites.

2. **Concern:** With additional visitors to the site each year, native vegetation and animals may be disturbed.

Consideration: By allowing visitors to interact only with certain parts of the natural ecosystem and by encouraging them to stay on paved surfaces elsewhere, this concern can hopefully be mitigated without the use of fencing.

3. **Concern:** With additional visitors to the site each year, groundwater may become polluted due to additional runoff and litter.

Consideration: The use of bioswales near parking areas and along the greenway will help cleanse pollutants from the water before it reaches the canal or other water bodies.

4. **Concern:** With the site running through so many private properties, owners may be unwilling to allow the project to use the preferred alignment.

Consideration: If an agreement cannot be reached with the property owner, alternative alignments with similar surroundings will be used.

5. **Concern:** Visitors currently have no safe access to the canal itself.

Consideration: This design will provide limited access in safe areas while preserving the historic integrity of the canal.

6. **Concern:** The rail line on the site remains in active use in some places, and more information is needed to find out who owns what portions of the track.

Consideration: Investigate which portions of track are in current operation and by whom.

SITE HISTORY AND SUMMARY

Located in southeastern Indiana, the towns of Brookville and Metamora have been connected by canal and rail since the early 1800s. Having seen improvements to state infrastructure happening nearby in Ohio and in states farther east, Indiana was desperate to prove itself a vital and well-built link to the West and in 1836, Indiana legislators passed the Mammoth Internal Improvement Bill. The Bill provided \$13,000,000 to build canals, a railroad, and turnpikes in Indiana, dramatically increasing interconnectedness and ease of travel within the young state. The Whitewater Canal was funded by this bill, as was the Central Canal in Indianapolis, along with various other small projects. However, only the Whitewater Canal was completed in its entirety before the Panic of 1837 hit and the state found itself out of money. This, combined with flooding and drought issues and the inherently slow transport times by canal, led to the transition to rail. Track was laid along the old towpath and the railroad has, in some capacity, been in operation there ever since.

The site is an 8.5-mile stretch of rail line and canal between Metamora and Brookville. The site's northwestern terminus is in Metamora, Indiana, and begins at the existing lock in town. The site then follows the rail line and canal out of town, past the Duck Creek

Aqueduct, to continue on towards Brookville. The site joins up with the existing Metamora Trailhead less than a mile outside of town, and follows its alignment until the trail ends 2.6 miles down the canal. From there, the site continues along the canal until it meets the Yellow Bank Trail, which it follows for a mile. The site then continues to follow the canal, winding through farmland and deciduous native forests, until it reaches its southern terminus at Brookville and the Tecumseh Landing area south of town. The alignment of the project site along this path will give visitors the best experience of the Whitewater Trail in this region. The site's proximity to native deciduous woodland as well as active farmland provides unique opportunities for education as well. Similarly, the existing structures once instrumental to the working of the canal can now provide engineering education opportunities to visitors.

The existing trails and trailheads included in this site lack attractive amenities and provide ample room for improvement. Design of this project will include the retrofitting or restructuring of the areas already designated as trailheads, and will provide at least one more trailhead in the Brookville portion of the site. The existing trail will be completely redesigned to provide visitors of all abilities with the best experience possible.

All maps provided below are shown without scale. North is located at the top of each map unless otherwise noted. All maps courtesy of Google Earth unless otherwise noted. The orange line indicates the approximate alignment of the Whitewater Canal and thus the project site.

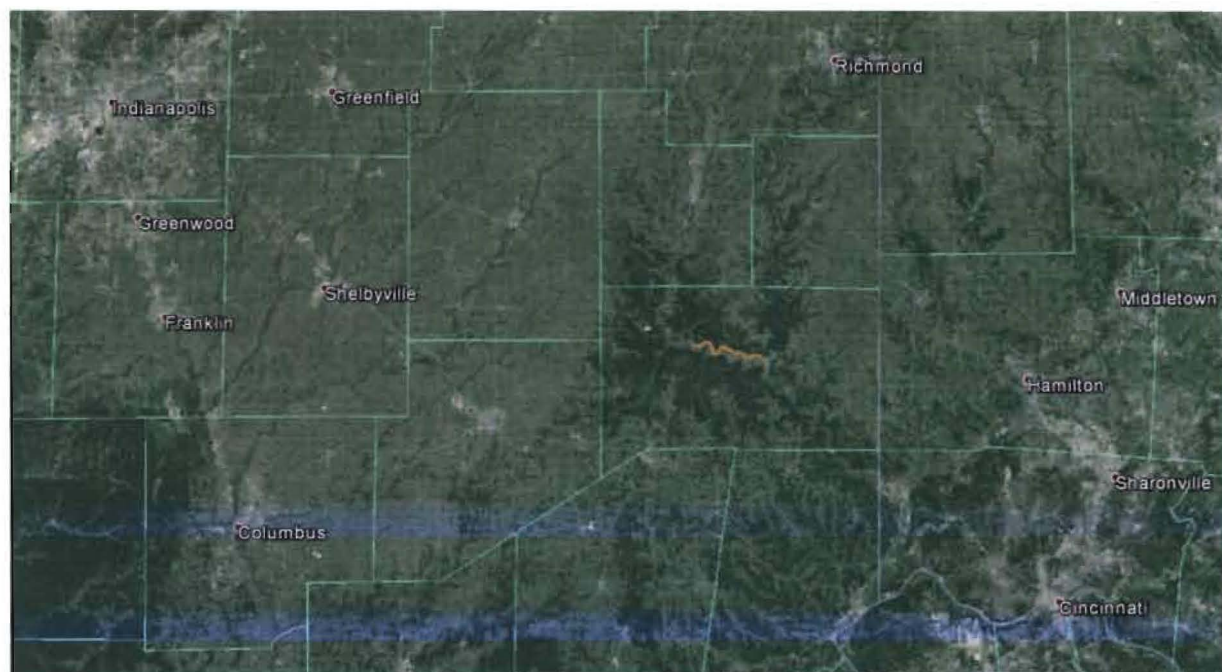


Fig. 1: Location Map showing the site (orange line) in relation to Indianapolis, Indiana and Cincinnati, Ohio.



Fig. 2: Map showing site (orange line) from Metamora to Brookville. North is oriented to the inside binding.



Fig. 3: Map showing northern terminus of site (orange line) in Metamora, Indiana.



Fig. 4: Map showing southern terminus of site (orange line) in Brookville, Indiana.



Fig. 5: Main Street in Brookville, looking south. Photo courtesy Google Earth.



Fig. 6: Canal and historic Mill in Metamora, c. 2013. Photo taken on north bank of canal looking southwest, by author.



Fig. 7: Looking east along the canal and rail line in Metamora, c. 2013. Photo by author.

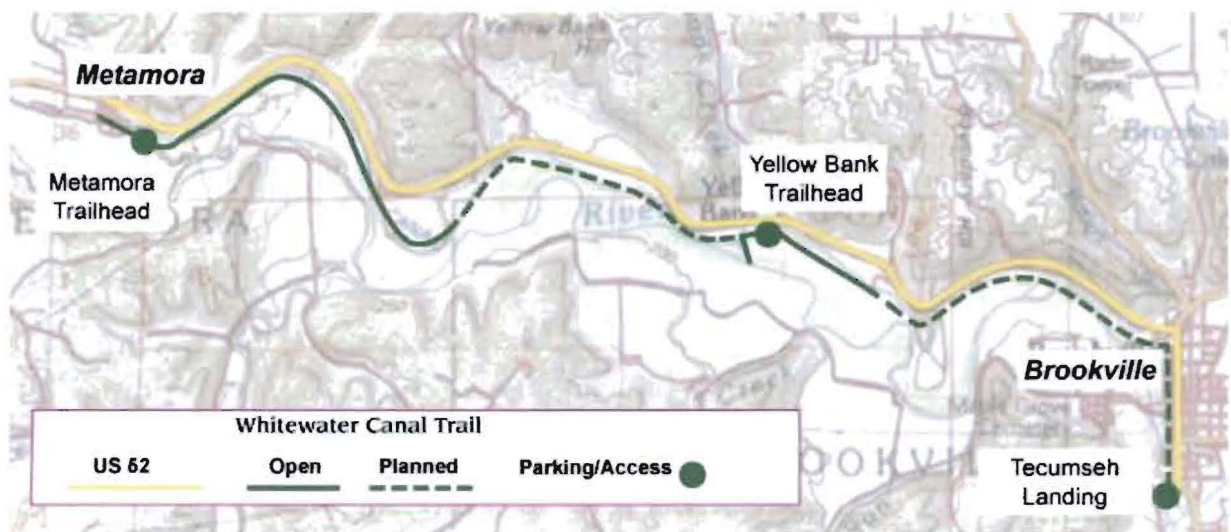


Fig. 8: Existing trail map. Image courtesy whitewatercanaltrail.com.



Fig. 9: Existing Metamora Trailhead along US-52, looking east. Photo courtesy Google Earth.



Fig. 10: Existing Yellow Bank Trailhead along US-52, looking southeast. Photo courtesy Google Earth.

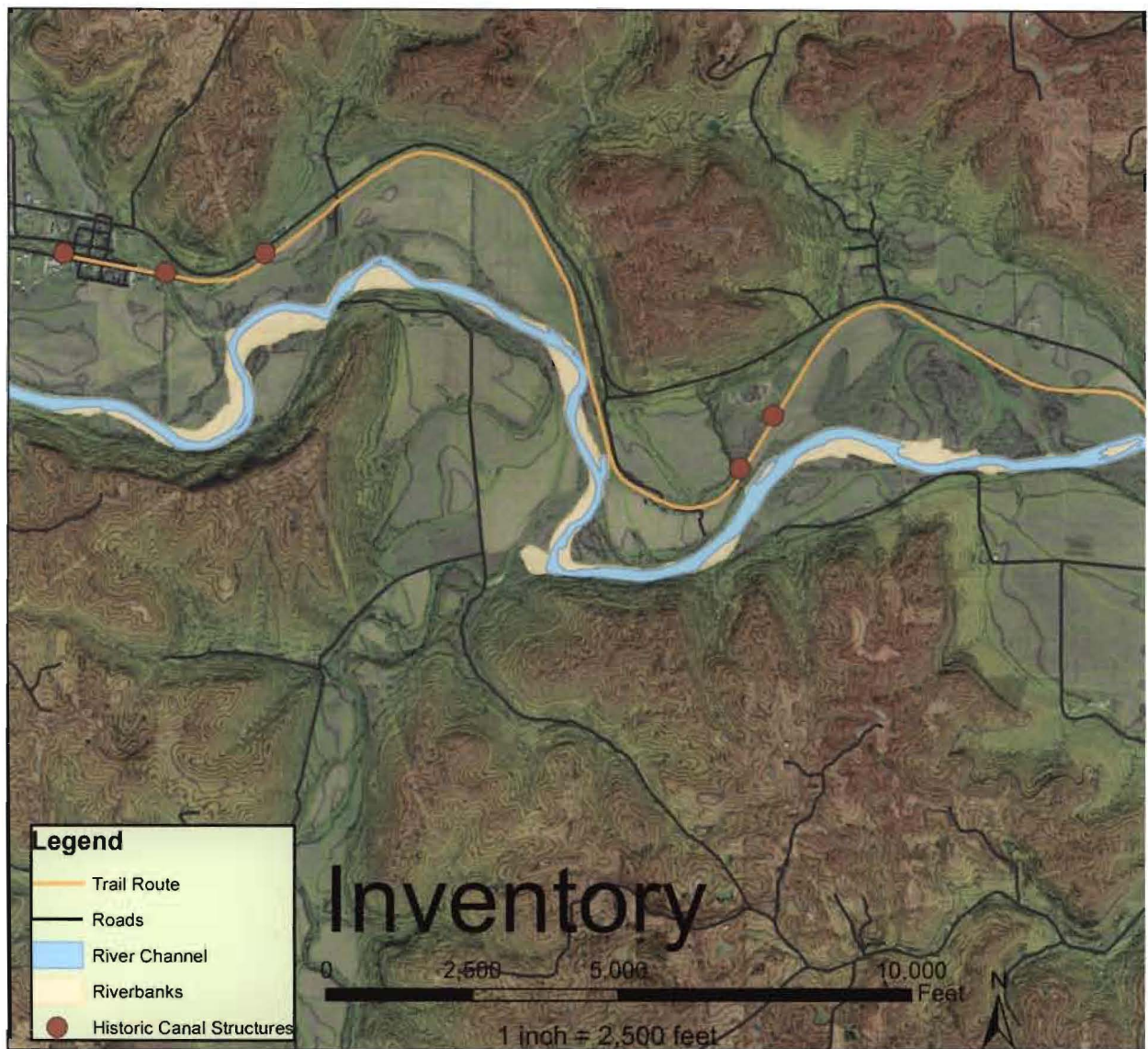
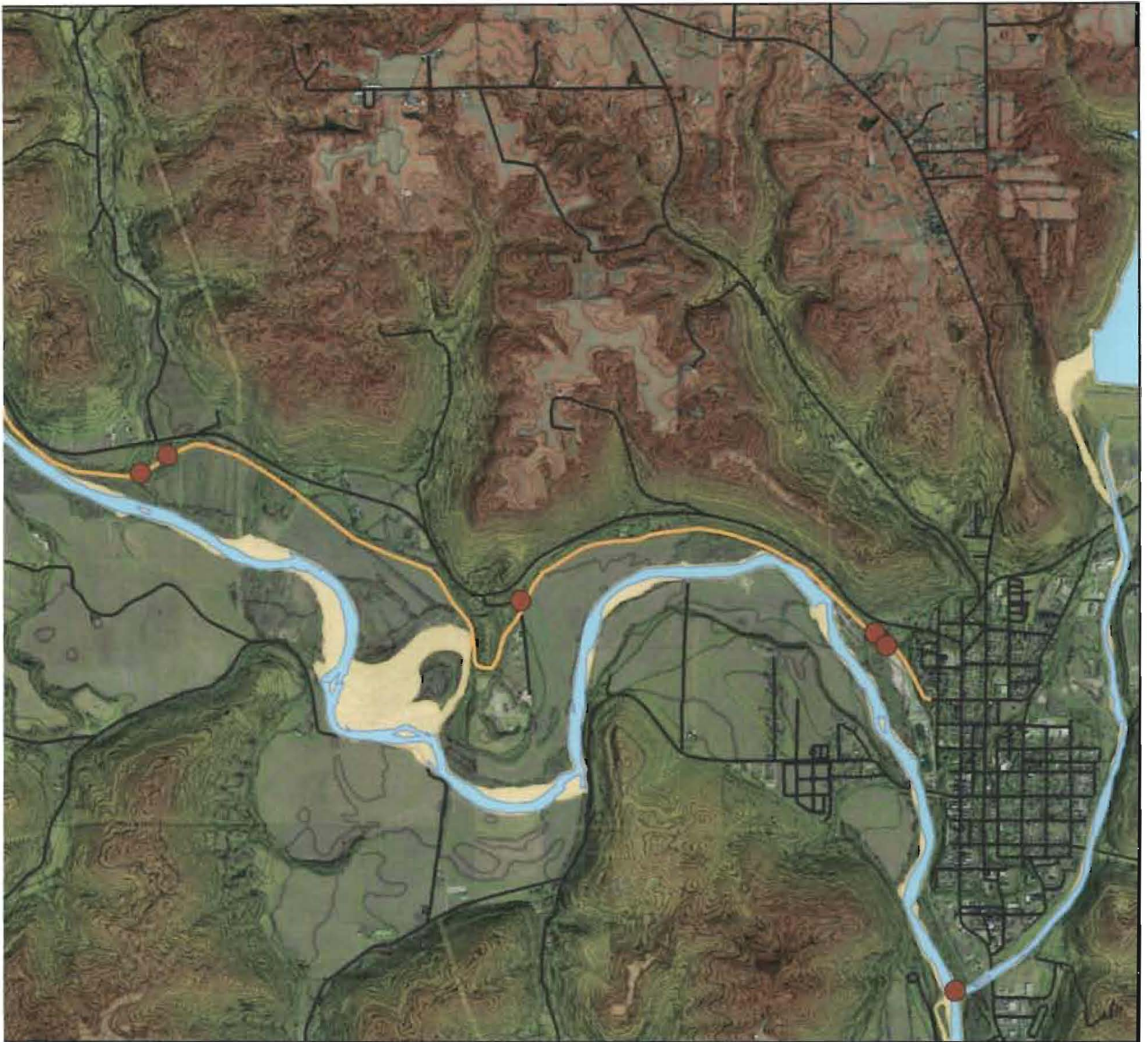


Figure 11: GIS Inventory of Project Site: Continued on facing page.

SITE INVENTORY

The alignment of the trail is delimited by an orange line. Topography is shaded with red showing the peaks and green denoting valleys, and the contour lines are in two-foot intervals. Major roads are highlighted in black. Historic structures, dating to the era of the canal and railroad, have been identified as areas of interest for visitors and are shown

with brown dots. Site conditions were incredibly conducive to trail design. Despite the rich topography of the surrounding area, both the canal and rail line were laid in the Whitewater River floodplain, resulting in a relatively flat transverse line along the project site, as is visible in the overall site section on the next two pages.



Overall the site lends itself well to the three main goals outlined at the beginning of the Site Overview section. With a variety of historic resources close to the trail's alignment, the public can easily see the true nature of the Whitewater River Valley's history for this eight-mile stretch. Winding the trail through the relatively flat floodplain allows for an easily accessible greenway that visitors of all ability

and activity levels can use throughout the year. A diverse range of natural habitats also allows visitors to get a better understanding of the native ecosystems at play in this region of Indiana. The trailside areas that have been recently disturbed and replanted with native vegetation also serve as an excellent learning opportunity for visiting schoolchildren or any citizens interested in native plants.



^ Figure 12: GIS Base with Analysis of Connections and Views on Project Site: Continued on facing page.



ANALYSIS OF CONNECTIONS AND VIEWS

Green arrows denote good views from the trail, especially of natural areas or the river corridor, that are highlighted in the final design.

These areas have also led to an analysis of certain overlooks which are discussed later in the Concepts Section. Red and black-dashed lines denote the locations of high-tension



Figure 13: Section cut following the line of the Towpath Trail from Metamora to Brookville. Continued on facing page.



power lines, which provide both an opportunity for viewing long distances as well as an unsightly constraint that mars the natural landscape. Orange bubbles are areas in which

the trail and canal are within view of US 52. Solid black lines denote ridge peaks. Blue arrows show the views from the trail to open areas of ecological and historic interest.

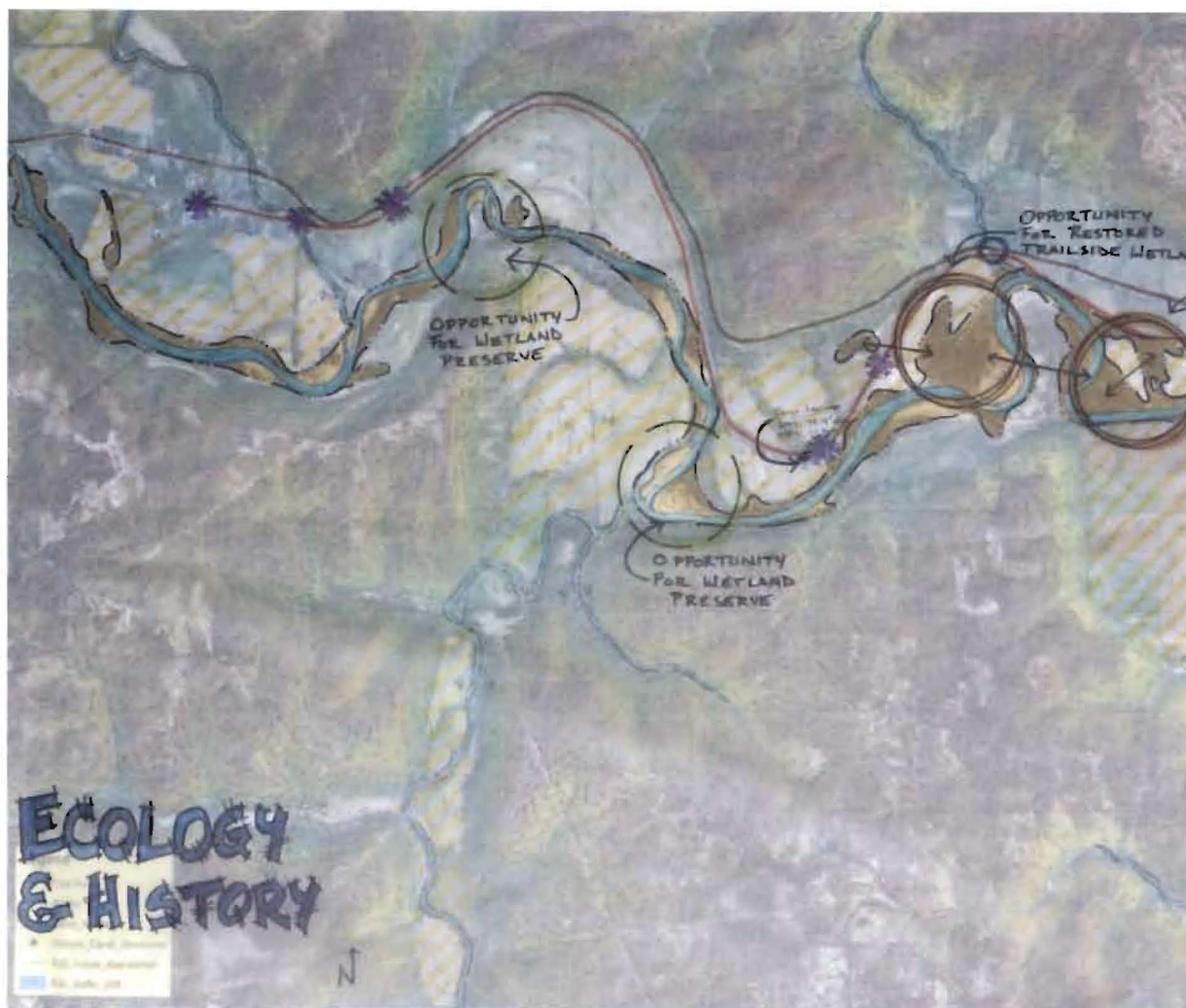


Figure 14: GIS Base with Analysis of Ecology and History on Project Site: Continued on facing page.

ANALYSIS OF ECOLOGY AND HISTORY

Purple asterisks denote areas with significant historical value for either the canal or railroad, and are therefore places in which the trail has either a pocket park/observation area or extra educational signage. Agricultural land in the river and stream floodplains is denoted with a light sand-colored stripe. The tan area delineates historic wetlands, the most

the most immediate area of impact to restore the Whitewater River to a healthier stage, and these areas will be protected when possible through future land acquisition. Green circles show where a non-accessible wetland preserve exists while brown circles show where an accessible trailside wetland has been added.

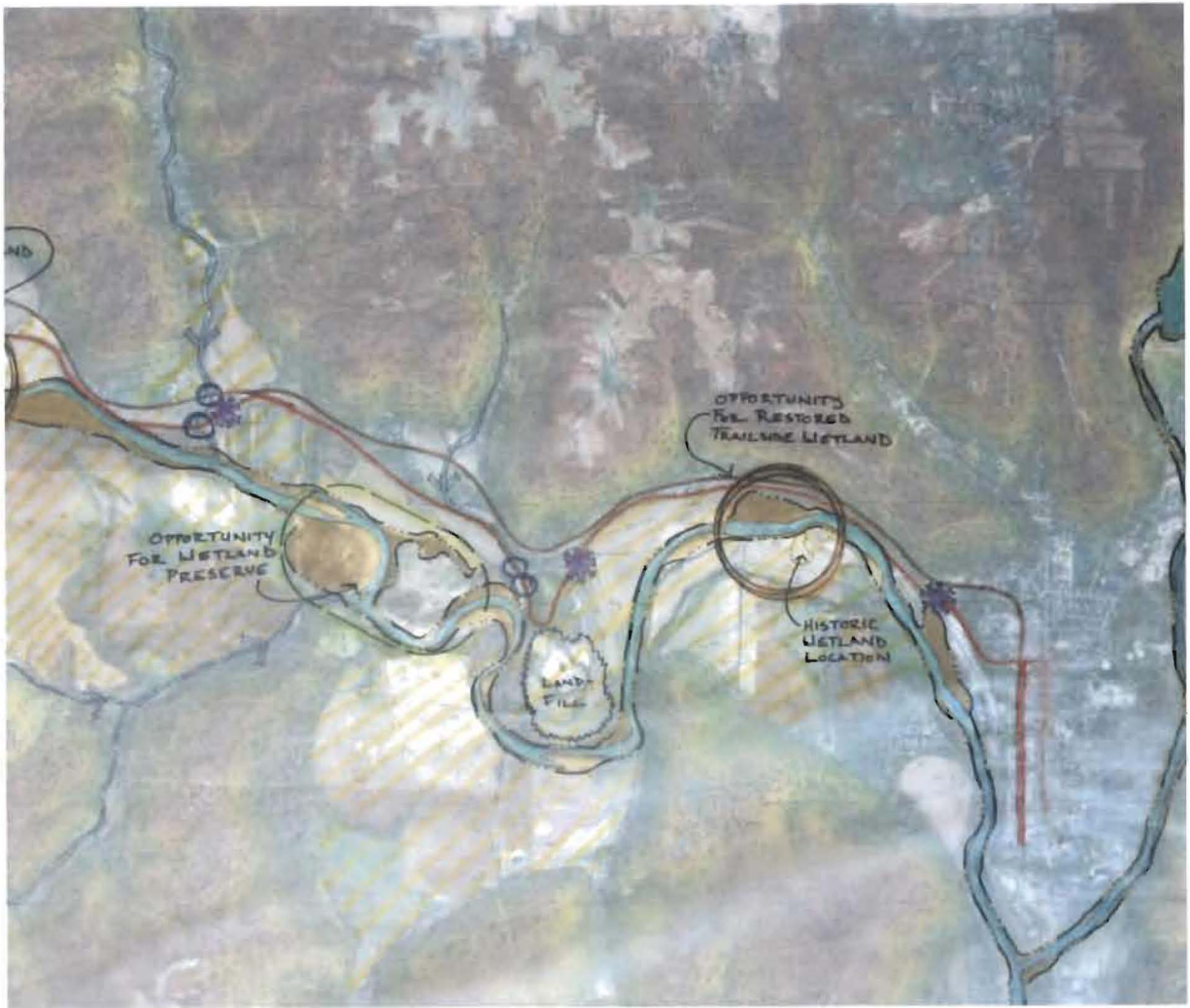
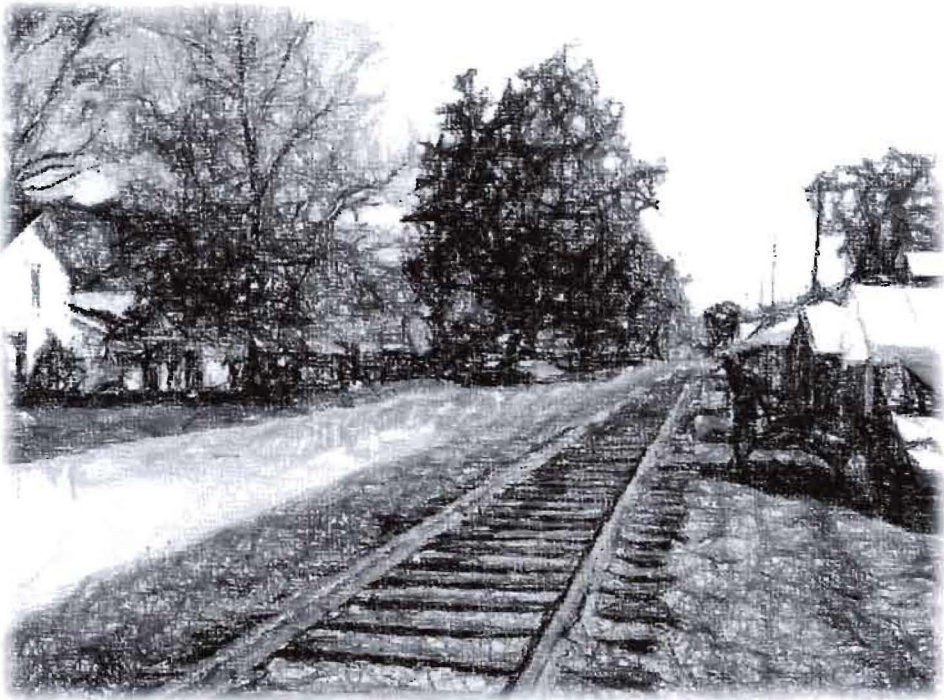


Figure 15: Historic Duck Creek Aqueduct, Metamora. Photo Credit: Kayla Lutz.

Methodology



[PRECEDENTS]

INTRODUCTION

This project would not be complete without an explanation of methodology of further research techniques. While the literature review covered the overarching methods of design needed to construct a framework for the Whitewater Canal Towpath Trail, a second round of more in-depth, site-specific research had to be conducted for the project to be fully successful. Both an analysis of a number of case studies and an observation of the current site will be utilized to further inform design for the Trail. Detailed below are the parameters used to guide research in these areas.

CASE STUDIES

Case studies can be utilized for research in a variety of ways. Analysis and research methods, design techniques, material use, implementation of inspiration, clarity of theme, and visitors' use of project (if built) are key components to consider in the evaluation of case studies' success. Careful analysis of a collection of exemplary projects will help to guide the final design of the Whitewater Canal Towpath Trail. Projects to be investigated include the planned Lafitte Greenway and Revitalization Corridor by Design Workshop, Dean Sakamoto Architects' 2010 Farmington

Canal Greenway, the 2007 ChonGae Canal Restoration by MikYoung Kim Design, the planned Gowanus Canal Sponge Park™ by dlandstudio, and the Monon Greenway, White River Greenway, and Towpath Trail detailed in Greg Lindsey's 1999 article for *Landscape and Urban Planning* entitled "Use of Urban Greenways: Insights from Indianapolis".

One of the most important tasks prior to project initiation is analysis. While of course much of this is site-specific, techniques used in the case studies to gather additional information and to help support design could prove to be extremely useful. The same is true of research methods. By paying special attention to the methods utilized to gather new information in the studies above, new applications for data collection and research can be applied to the Whitewater Canal Towpath Trail.

Another important aspect to consider when looking at these case studies is the design techniques used by the architects, landscape architects, biologists, and engineers to create the final product. Of special interest for this project are techniques used for ecological restoration, water cleansing, habitat creation, preservation of existing structures, and interpretation of historic data. The ways in which these designers have implemented these techniques can help direct design for the

Whitewater Canal Towpath Trail. In a similar vein, material use is also of great interest for this design. The reclamation and reuse of historic pieces, as seen in a few of these case studies, will most surely prove beneficial in the design of the Towpath Trail.

Implementation of inspiration and clarity of theme help to truly tie a project together. By investigating the ways that the aforementioned case studies carry their themes through all aspects of the projects, methods can be developed for how exactly to do so on the Whitewater Canal Towpath Trail. When inspiration is correctly showcased in a project, it becomes a theme or building block for design that helps to cohesively unite the myriad pieces of a project of this scope. By carrying pieces through the entire site, greenways can be designed to have a thematic or unified feel that truly makes the greenway a unique space.

None of the above topics can truly showcase how well a place is designed as well as can the visitors who use it. Tracking and analyzing data on usage of a designed greenway helps monumentally in the development of other projects. By looking over the number of visitors per day, week, month, or year and comparing use at different time periods, one can get a great sense for just how active a similar greenway will be. Designers can also use this information to create an even more active

greenway, perhaps with better fall and winter activation of space. Amenities and their spacing can also be determined by with help from this data, in order to make the site easy to use and accessible for all.

OBSERVATION

Methods for observation differ from those used in the analysis of case studies. Ideally conducted in the winter, spring, and summer seasons, observation of the project site would include everything from climatic and microclimatic experiences on site to a survey of the existing topography, buildings, and structural elements. Recordings of numbers and types of plants and animals can also be conducted, with special attention paid to the needs of migratory species. A study of local hydrology in and around the Whitewater Canal can also be done after project completion. Human experiences around the site are also important to observe, including views to the canal, the existing rail line, to existing historic features, and to roads nearby such as US 52. Cross roads have been documented as well, especially in regards to sight lines for trail users and vehicles at crossings. Circulation through the site has been important to observe, with particular attention paid to what pieces of circulation work well and which can be easily

improved for a better visitors' experience. Of particular interest are also the termini of the site and how they can act as anchors for the project as a whole. The Whitewater Canal State Historic Site at Metamora sits at the northern terminus of the proposed trail, and approximately one mile south is the locally funded Whitewater Canal Trail, Inc. headquarters. The southern terminus is in Brookville. By recording information on the age and number of visitors to these sites, determinations can be made as to how best to encourage these visitors to continue onto the trail instead of just visiting the sites alone. Information gathered through observation will factor directly into the design and success of the Whitewater Canal Towpath Trail.

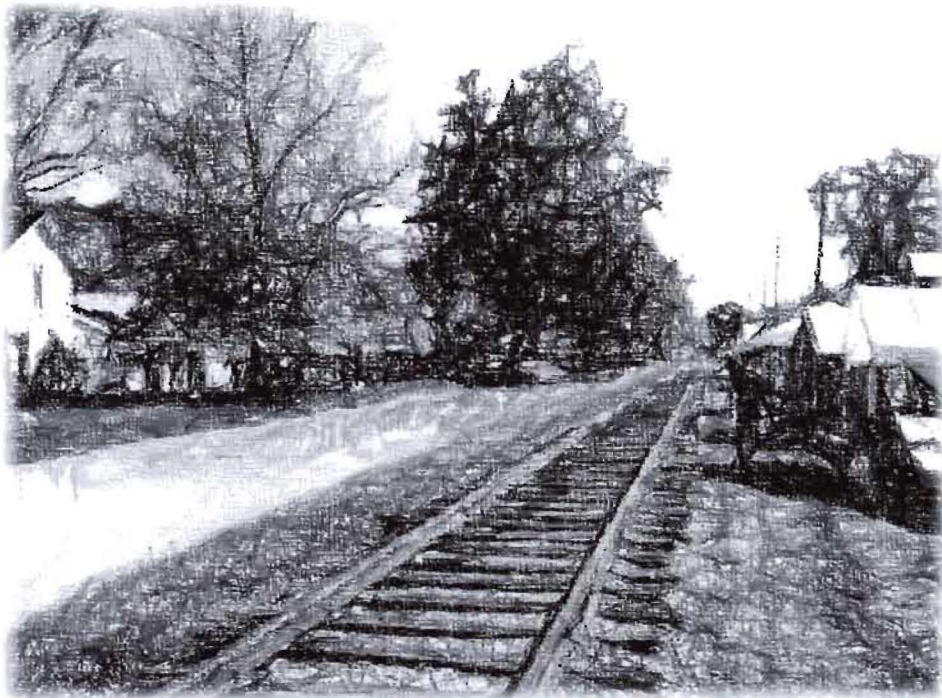
Rationale

Twin Locks Sketches

Landfill Road Sketches

Landfill Road Enlargement

Yellow Bank Enlargement



[CONCEPTS]

SITE A: TWIN LOCKS: Not Chosen

SITE B: BOUNDARY HILL

Site B was chosen due to its unique constraints and natural restoration opportunities. The site is situated at mile 6.70 from Metamora and is located just off on US 52. Visitors to the must park elsewhere and hike in along the trail.

The Boundary Hill site was not developed in detail in this plan, but concept diagrams were done for the area. This site is home to Franklin County's landfill, yet has excellent opportunities near the Whitewater River for protecting and restoring historic wetlands. Visitors to the site can learn about the landfill, but also see how natural buffering techniques are being used to buffer the Whitewater River from any runoff from the landfill. Slightly upstream, an historic oxbow and wetland serve as a new nature preserve, able to be viewed from the trail. This serves as an excellent learning opportunity for visiting schoolchildren. History on the site includes Boundary Hill, and markers are incorporated into the trail that show the location of where the line from the Treaty of 1795 crosses. This line once served as the westernmost border of European-American expansion into the newly acquired Midwest.

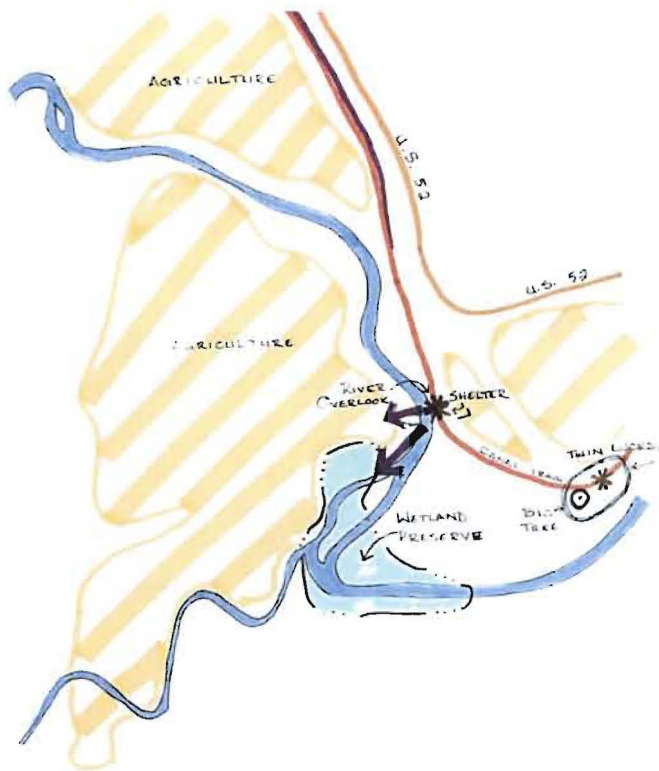
SITE C: YELLOW BANK TRAILHEAD

Site C was chosen due to its unique location and history. The site is situated at mile 5.50 from Metamora and is located right on US 52, giving the site excellent access and visibility for passerby. Visitors to the site park in a well-sized lot that accommodates twenty-four cars and also boasts four handicap-accessible spaces. The lot is ringed with bioswales planted with native plants to filter runoff from both the parking lot and from US 52.

The history available to interact with at the Yellow Bank Trailhead is threefold. Lock 24 is less than 0.15 miles from the entrance to the parking lot, and an historic rail road bridge, built in 1907 by the King Bridge Company, is a mere 380'-0" from the parking lot down the same trail. On the east side of the site, the old ice ponds are available for viewing. The shallow ponds were flooded and allowed to freeze, and large chunks of ice were cut and shipped via the canal and rail lines to Cincinnati.

The Yellow Bank Trailhead also boasts a full pavilion and restroom facility near the parking lot. This area can be used for picnics, gatherings, educational demonstrations, and any variation of other activities that might occur in this history-rich area. It is this site that was fully developed for this project.

CONCEPT SKETCHES: Site A: Twin Locks



Site A is located at mile 2.50 from Metamora, at one of the locations where the Whitewater River is most clearly visible from the Towpath Trail. This site shows the history of the canal and rail line with connections to the Twin Locks site. Similarly, the trail also shows natural history through the views of the river and the Heritage Tree, a Shellbark Hickory (*Carya lacinosa*), the biggest of its species still living in the state, and one of the biggest trees in Indiana.

NO FURTHER DEVELOPMENT

Figure 16: Concept Sketch for Twin Locks.

SITE A

- Shelter and overlook for river vista
- Connection with Twin Locks area
- Accessible trail design
- Connection to Heritage Tree
- Protected wetland preserve

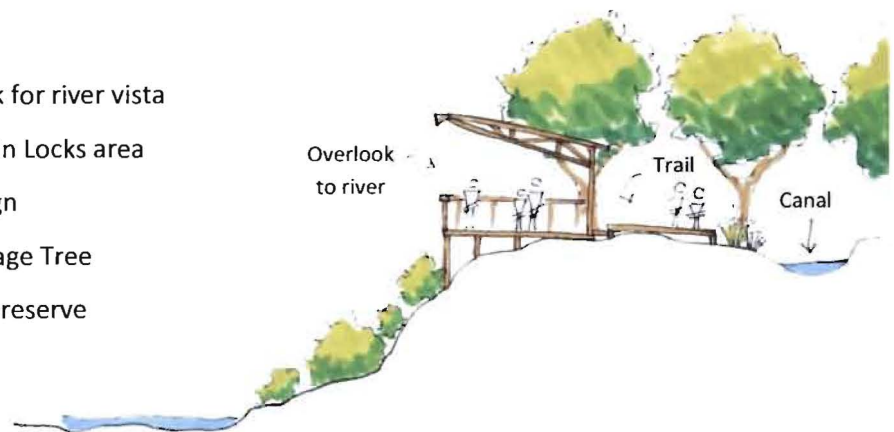


Figure 17: Section Concept for Twin Locks.

CONCEPT SKETCHES: Site B: Boundary Hill

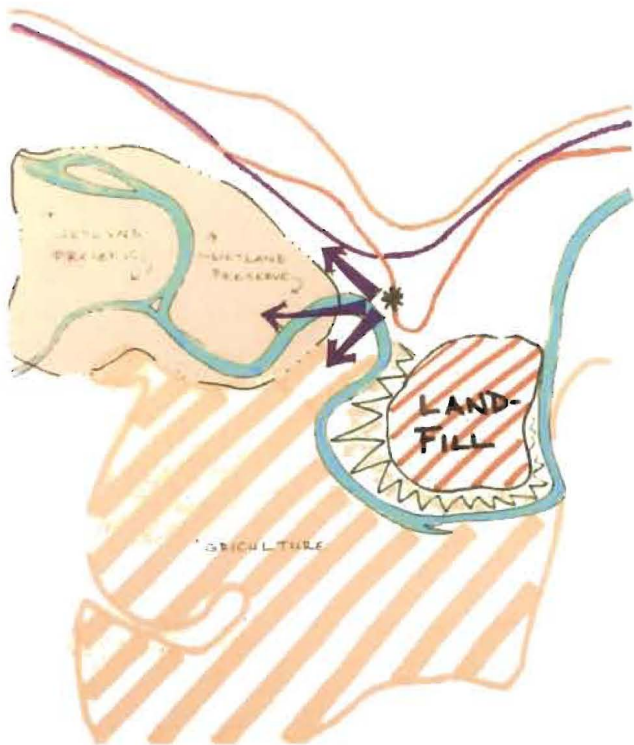


Figure 18: Concept Sketch for Boundary Hill.

Site B is located at mile 6.65 from Metamora, at one of the locations where the Whitewater River is most clearly visible from the Towpath Trail. The site is also located near the Franklin County landfill, which provides unique opportunities for restoration and education. Purchasing of agricultural land creates a larger wetland preserve. This site also features a connection to the Treaty of 1795 Boundary Line, which was the western line of the European-American expansion for years.

FURTHER DEVELOPMENT ON NEXT PAGES

SITE B

- Shelter and overlook for river vista
- Connection with Boundary Hill area
- Accessible trail design
- Protected wetland preserve

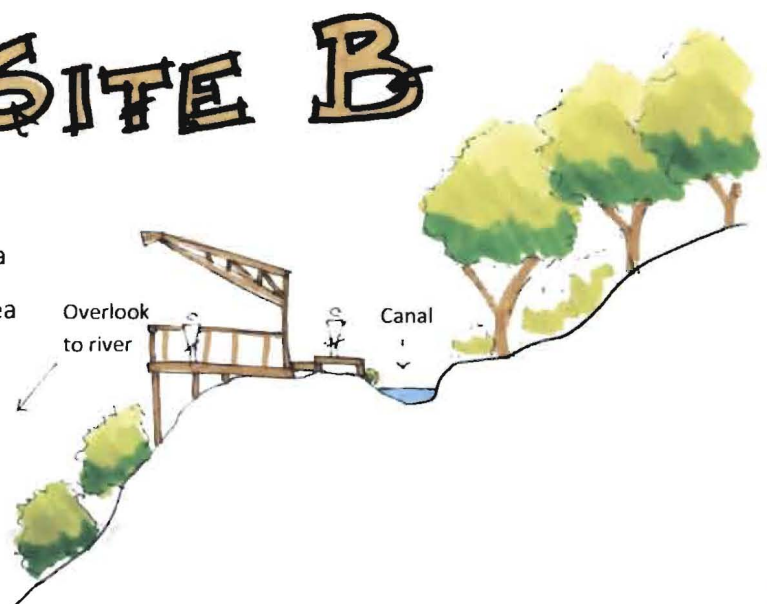
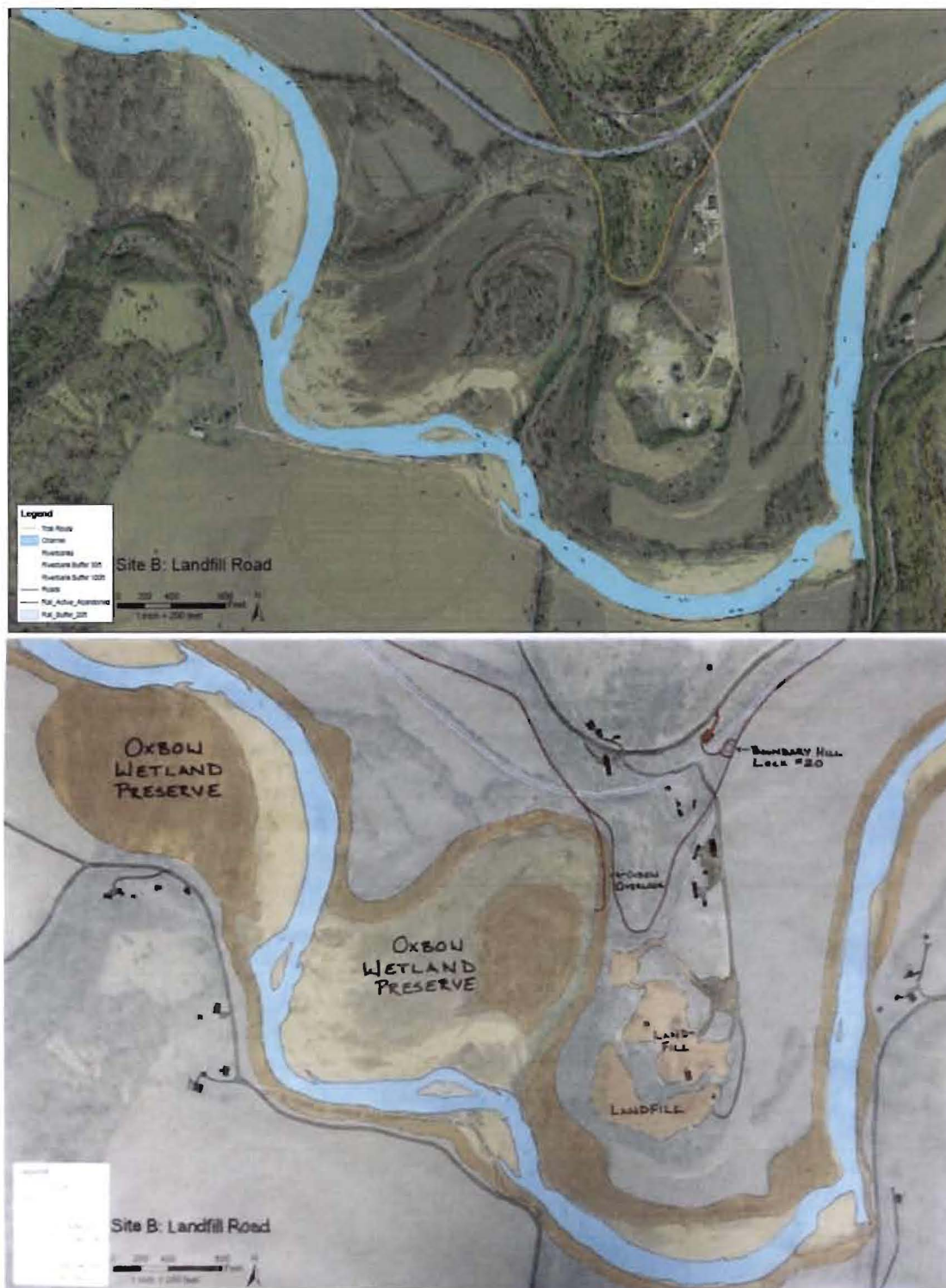


Figure 19: Section Concept for Boundary Hill.

SITE PLAN ENLARGEMENTS: SITE B: BOUNDARY HILL



SITE PLAN ENLARGEMENTS: SITE C: YELLOWBANK TRAILHEAD

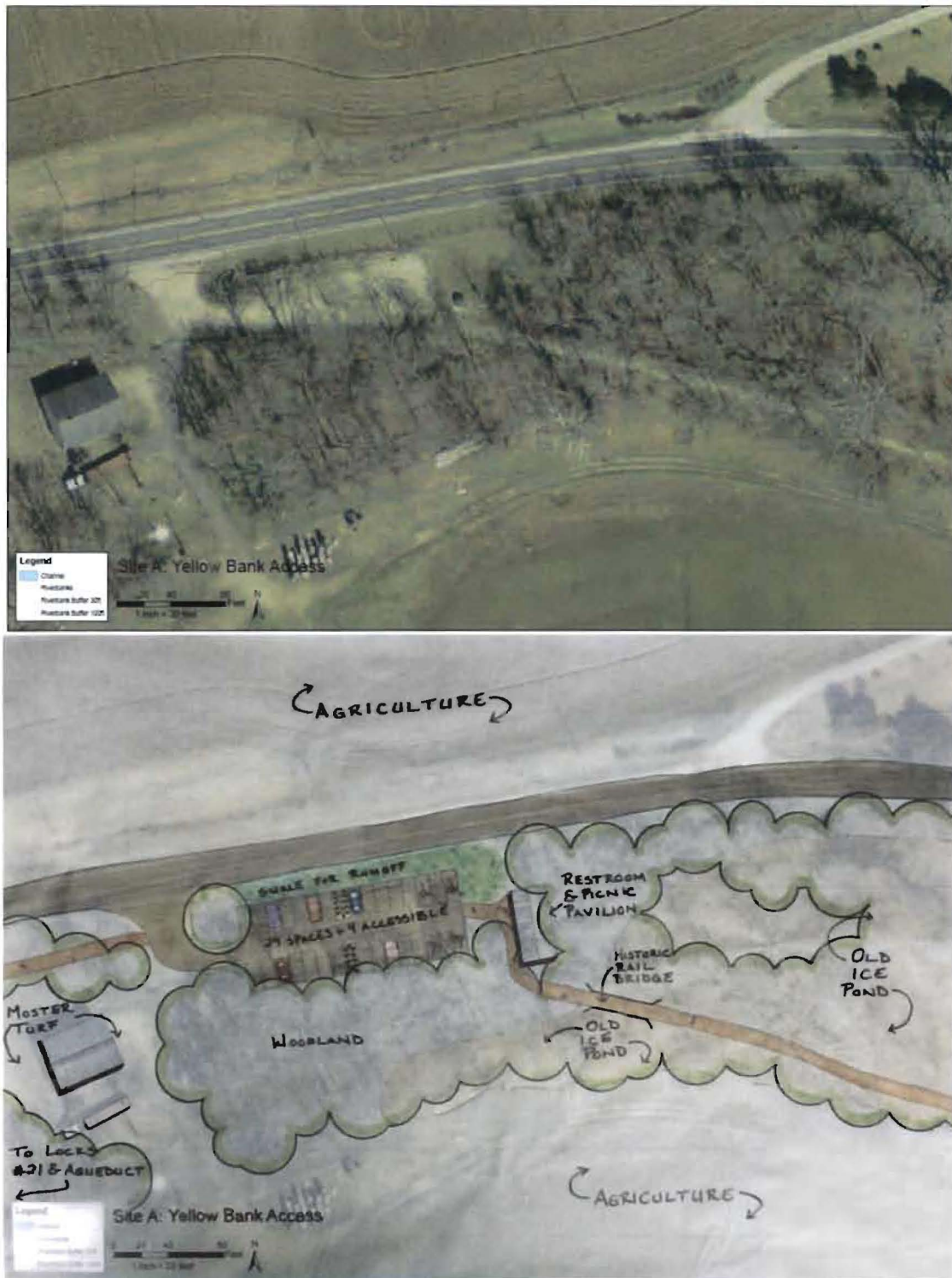


Figure 22 (above): Existing Conditions at Yellow Bank Site. Figure 23 (below): Proposal for Yellow Bank Site.

Site Design Rationale

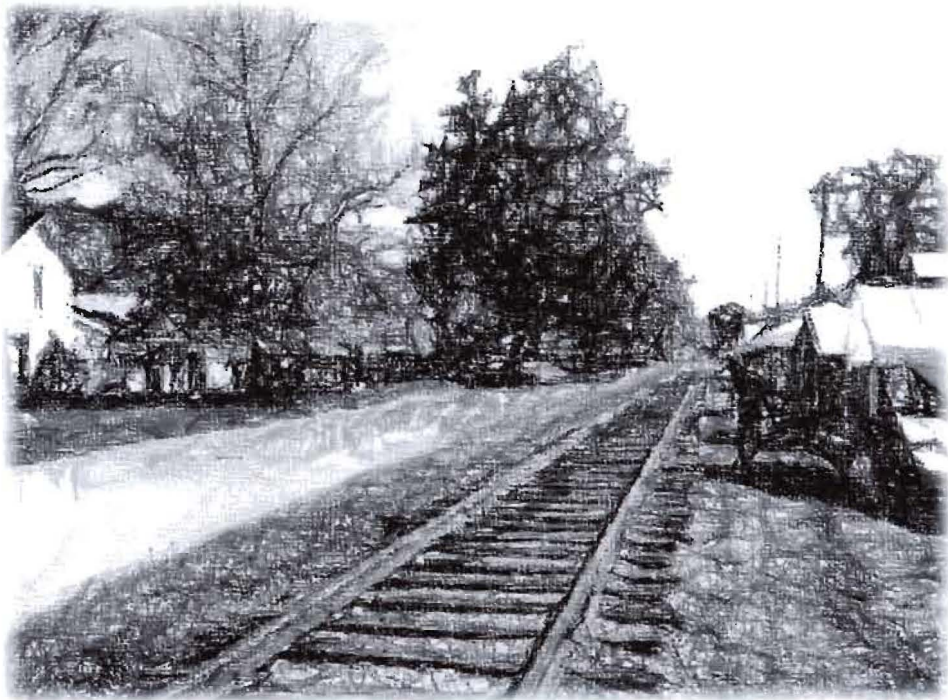
Master Plan

General Design

Plant Palettes

Yellow Bank Site Details

Conclusion



[DESIGN]

OVERALL DESIGN RATIONALE

The Towpath Trail provides opportunities for local citizens and visitors alike to experience nature and history on a personal level. Providing these types of spaces helps enrich lives and reconnects neighbors in ways that many other sites cannot. Allowing people to learn, play, and exercise together forges strong bonds.

The Towpath Trail features a variety of amenities along its length. The illustrative plan on the following pages demonstrates the areas in which amenities are clustered as well as denotes the type of amenities in each location. Amenities include:

- Trailheads
- Restrooms
- Handicap Accessibility
- Shelters
- Parking
- Canal History
- Rail History
- River Overlooks

The actual surface of the trail itself is of asphalt. This allows for low maintenance and high durability. An aggregate base provides stability as well as a slight filter for large particulates as water flows off the trail and into bioswales located on either side. The use of asphalt also allows for year-round use, as those who wish to go cross-country skiing could use the trail without damaging either it or their equipment.

Plant palettes are provided in order to showcase the types of vegetation installed along the trail. Only native species were used, in order to provide spaces for native animals to find food and shelter. These native plant strips, when used in shallow bioswales along the length of the trail and parking lots, also serve as filters for cleansing stormwater runoff. Bioswales are also incorporated around all bathrooms and shelters.

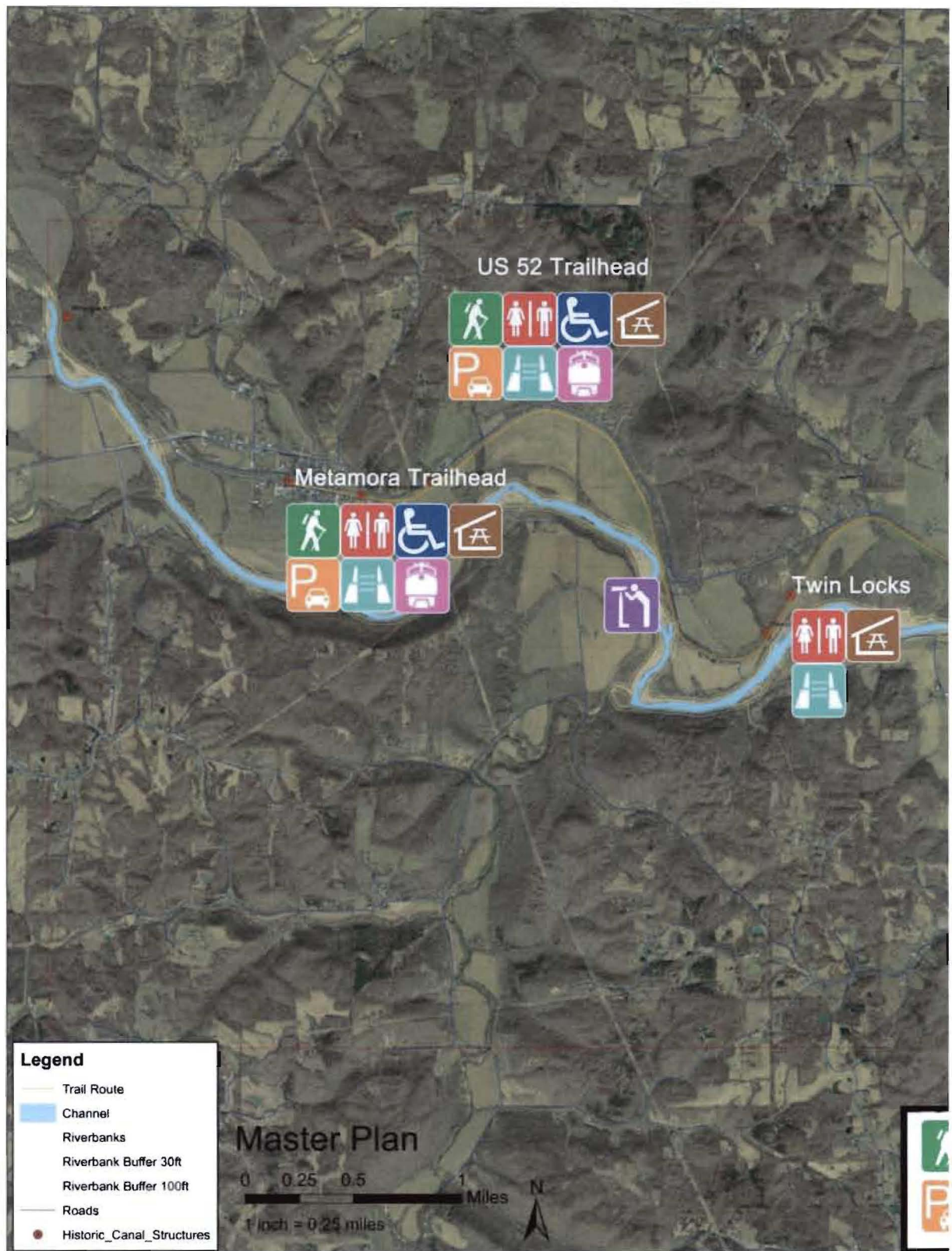
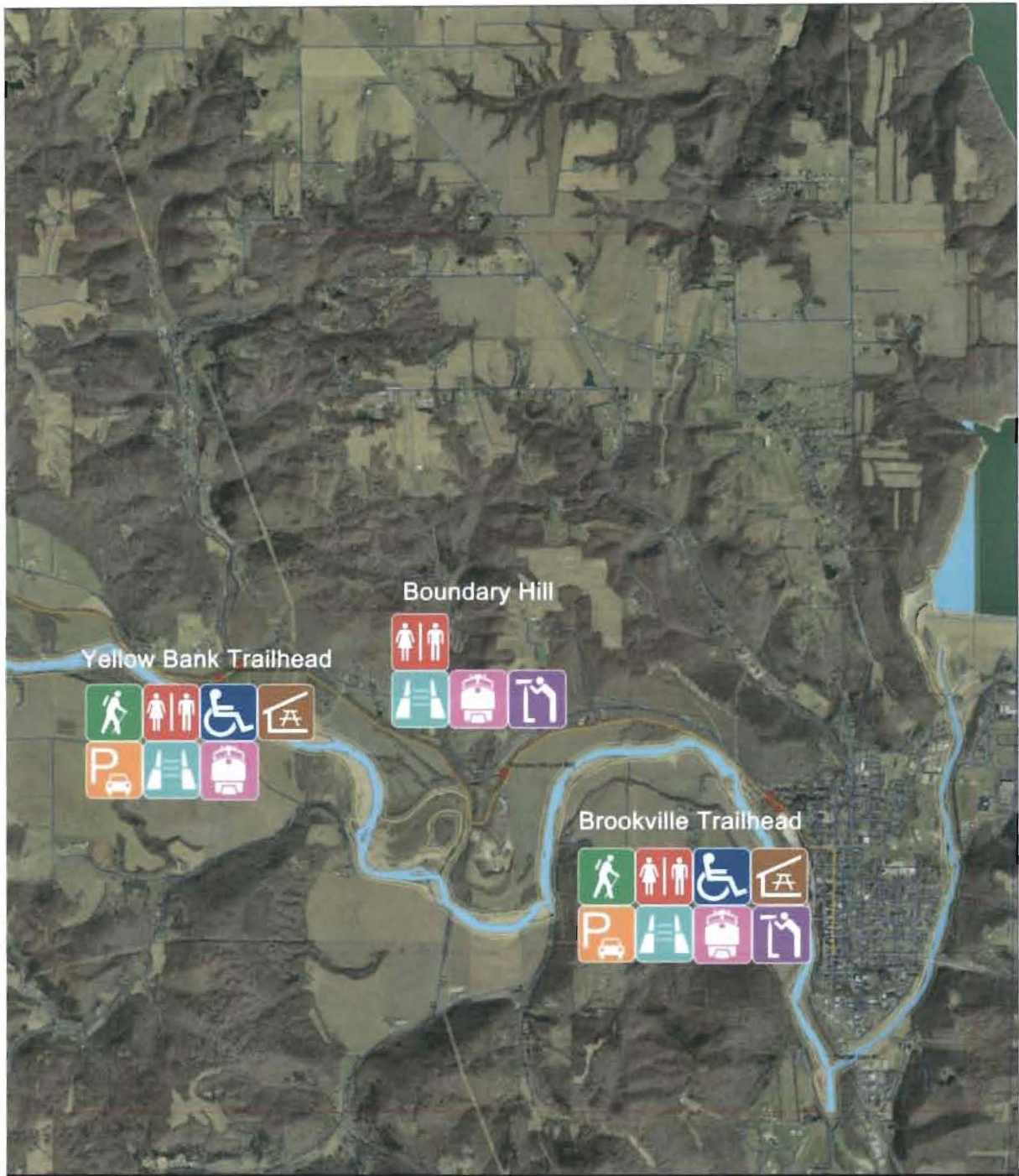
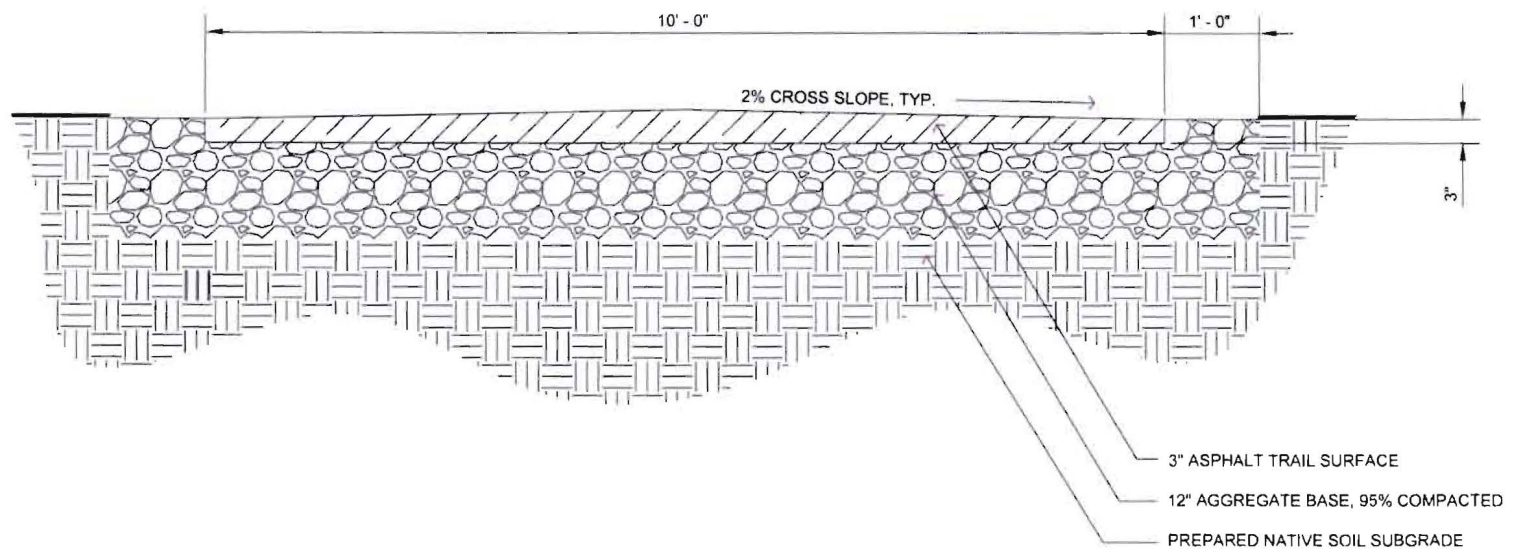


Figure 24: Master Plan of Amenity Locations, Continued on facing page.



	Trailhead		Restrooms		Accessible		Shelter
	Parking		Canal History		Rail History		River Overlook

Figure 25: Section of Trail.



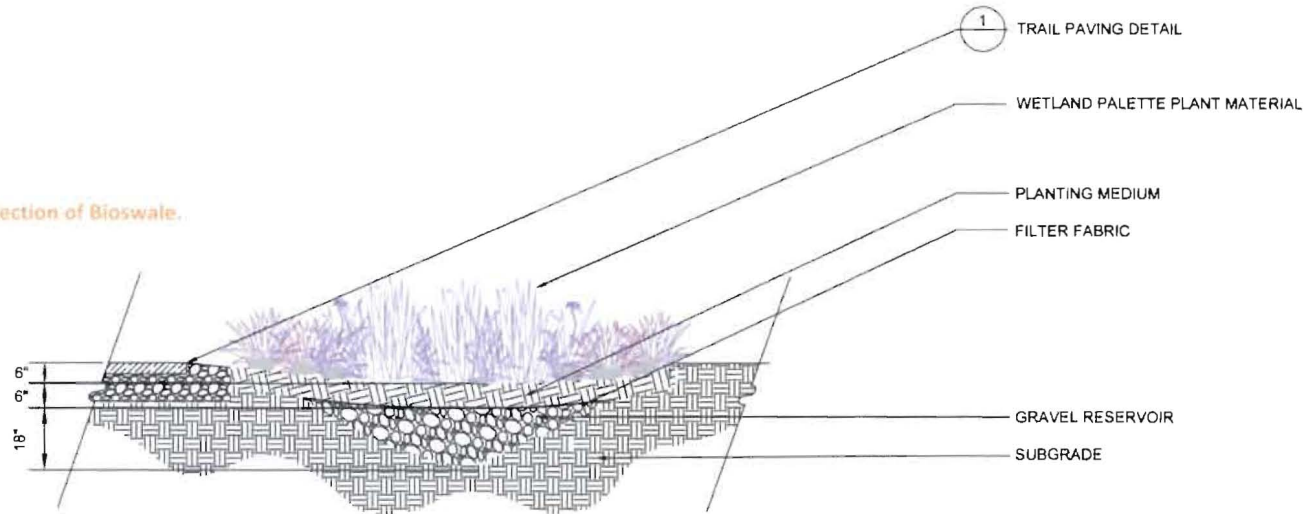
1/2" = 1'-0"

TRAIL DETAIL

1" = 1'

SECTION

Figure 26: Section of Bioswale.



10'-0" WIDTH TYP. FOR ALL BIOSWALES

2

BIOSWALE DETAIL

1/2" = 2'-0"

SECTION



ILLUSTRATIVE SECTION

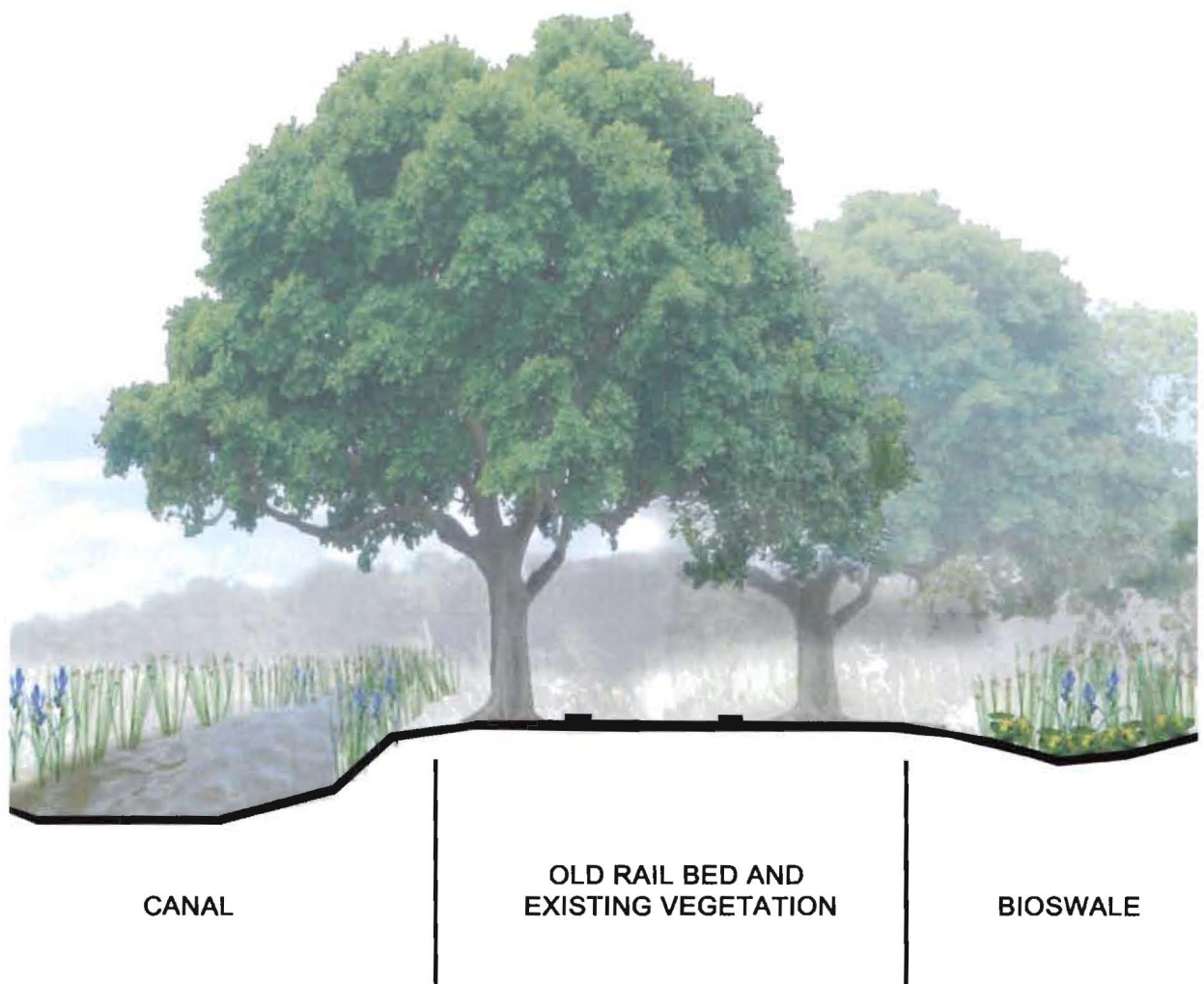


Figure 27: Illustrative Section. Continued on facing page.



10'-0" ASPHALT PATH WITH
1'-0" GRAVEL SHOULDER ON EACH. SIDE

BIOSWALE

EXISTING
VEGETATION

PRAIRIE PALETTE



Amsonia tabernaemontana
Blue Star Willow
2 - 3' H, 2 - 3' S
Blooms: May
Full Sun - Part Shade
Water: Medium



Asclepias tuberosa
Butterfly Weed
1 - 2.5' H, 1 - 1.5' S
Blooms: Jun. - Aug.
Full Sun
Water: Dry - Medium



Baptisia australis
False Blue Indigo
3 - 4' H, 3 - 4' S
Blooms: May - Jun.
Full Sun - Part Shade
Water: Dry - Medium



Coreopsis palmata
Plains Coreopsis
1 - 2' H, 1 - 2' S
Blooms: Jul. - Aug.
Full Sun
Water: Dry - Medium



Dodecatheon meadia
Shooting Star
.75 - 1.5' H, .75 - 1.5' S
Blooms: May
Part Shade - Full Shade
Water: Medium



Echinacea purpurea
Purple Coneflower
3 - 4' H, 2 - 4' S
Blooms: Jun. - Aug.
Full Sun - Part Sun
Water: Dry - Medium



Rudbeckia hirta
Black-Eyed Susan
2 - 3' H, 1 - 2' S
Blooms: Jun. - Sept.
Full Sun
Water: Medium



Solidago speciosa
Showy Goldenrod
2 - 3' H, 2 - 3' S
Blooms: Jul. - Sept.
Full Sun
Water: Dry - Medium



Bouteloua curtipendula
Side-Oats Gramma
1.5 - 2.5' H, 1.5 - 2' S
Blooms: Jul. - Aug.
Full Sun
Water: Dry - Medium



Panicum virgatum
Switchgrass
3 - 6' H, 2 - 3' S
Blooms: Jul. - Feb.
Full Sun - Part Shade
Water: Medium - Wet



Schizachyrium scoparium
Little Bluestem
2 - 4' H, 1.5 - 2' S
Blooms: Aug. - Feb.
Full Sun
Water: Dry - Medium



Sporobolus heterolepis
Prairie Dropseed
2 - 3' H, 2 - 3' S
Blooms: Aug. - Oct.
Full Sun
Water: Dry - Medium

Figure 28: Prairie plant palette.

WETLAND PLANT PALETTE



Asclepias incarnata
Marsh Milkweed
4 - 5' H, 2 - 3' S
Blooms: Jul. - Aug.
Full Sun
Water: Medium - Wet



Caltha palustris
Marsh Marigold
1 - 1.5' H, 1 - 1.5' S
Blooms: Apr. - Jun.
Full Sun - Part Shade
Water: Wet



Chelone glabra
Turtlehead
2 - 3' H, 1.5 - 2.5' S
Blooms: Aug. - Oct.
Part Shade
Water: Medium - Wet



Filipendula rubra
Queen of the Prairie
6 - 8' H, 3 - 4' S
Blooms: Jun. - Aug.
Full Sun - Part Shade
Water: Medium - Wet



Hibiscus moscheutos
Swamp Rose Mallow
2 - 2.5' H, 1.5 - 2' S
Blooms: Jul. - Sept.
Full Sun
Water: Medium - Wet



Iris cristata 'Alba'
Dwarf Crested Iris
0.5 - 0.75' H, 0.5 - 1' S
Blooms: Apr.
Full Sun - Part Sun
Water: Medium



Iris virginica
Blue Flag Iris
1 - 3' H, 1 - 3' S
Blooms: Jun.
Full Sun
Water: Medium - Wet



Vernonia gigantea gigantea
Ironweed
5 - 8' H, 3 - 6' S
Blooms: Aug. - Sept.
Full Sun - Part Shade
Water: Medium - Wet



Carex cristatella
Crested Sedge
1 - 3' H, 1 - 2' S
Blooms: May - Jun.
Full Sun - Part Shade
Water: Medium - Wet



Carex frankii
Frank's Sedge
1 - 2' H, 1 - 2' S
Blooms: May - Sept.
Full Sun - Part Shade
Water: Wet



Carex stricta
Tussock Sedge
1 - 3' H, 1 - 2' S
Blooms: May - Jun.
Full Sun - Part Shade
Water: Medium - Wet



Carex vulpinoidea
Fox Sedge
1 - 3' H, 0.5 - 2' S
Blooms: May - Jul.
Full Sun - Part Shade
Water: Wet

Figure 29: Wetland plant palette.

SHADE PALETTE



Aquilegia canadensis
Columbine
2 - 3' H, 1 - 1.5' S
Blooms: Apr. - May
Full Sun - Part Shade
Water: Medium



Arisaema triphyllum
Jack-in-the-Pulpit
1 - 2' H, 1 - 1.5' S
Blooms: Apr. - May
Part Shade - Full Shade
Water: Medium - Wet



Asarum canadense
Wild Ginger
0.5 - 1' H, 1 - 1.5' S
Blooms: Apr. - May
Part Shade - Full Shade
Water: Medium - Wet



Chelone glabra
Turtlehead
2 - 3' H, 1.5 - 2.5' S
Blooms: Aug. - Oct.
Part Shade
Water: Medium - Wet



Dicentra cucullaria
Dutchman's Breeches
0.5 - 1' H, 0.5 - 1' S
Blooms: Mar.
Part Shade - Full Shade
Water: Medium



Erythronium americanum
American Trout-Lily
0.25 - 0.5' H, 0.25 - 0.5' S
Blooms: Apr.
Part Shade - Full Shade
Water: Medium



Osmunda cinnamomea
Cinnamon Fern
2 - 3' H, 2 - 3' S
Blooms: N/A
Part Shade - Full Shade
Water: Medium - Wet



Podophyllum peltatum
May-Apple
1 - 1.5' H, 0.75 - 1' S
Blooms: Apr.
Part Shade - Full Shade
Water: Medium



Polygonatum biflorum
Solomon's Seal
1 - 3' H, 1 - 1.5' S
Blooms: Apr. - May
Part Shade - Full Shade
Water: Medium - Wet



Polystichum acrostichoides
Christmas Fern
1 - 2' H, 1 - 2' S
Blooms: N/A
Part Shade - Full Shade
Water: Dry - Medium



Sanguinaria canadensis
Bloodroot
0.5 - 0.75' H, 0.25 - 0.5' S
Blooms: Mar. - Apr.
Part Shade - Full Shade
Water: Medium



Trillium grandiflorum
Wood Lily
1 - 1.5' H, 0.75 - 1' S
Blooms: Apr. - Jun.
Part Shade - Full Shade
Water: Medium

Figure 30: Shade plant palette.

SHRUB PALETTE



Amelanchier canadensis
Serviceberry
15 - 20' H, 15 - 20' S
Blooms: Apr. - May
Full Sun - Part Shade
Water: Medium



Callicarpa americana
Beautyberry
3 - 6' H, 3 - 6' S
Blooms: Jun. - Aug.
Full Sun - Part Shade
Water: Medium



Ceanothus americanus
New Jersey Tea
3 - 4' H, 3 - 5' S
Blooms: May - Jul.
Full Sun - Part Shade
Water: Dry - Medium



Dirca palustris
Leatherwood
4 - 6' H, 4 - 6' S
Blooms: Mar. - Apr.
Full Sun - Part Shade
Water: Medium



Hamamelis virginiana
American Witch-Hazel
15 - 20' H, 15 - 20' S
Blooms: Oct. - Dec.
Part Shade - Full Shade
Water: Medium



Hydrangea arborescens
Wild Hydrangea
3 - 5' H, 3 - 5' S
Blooms: Jun. - Sep.
Part Shade
Water: Medium



Ilex verticillata
Common Winterberry
3 - 12' H, 3 - 12' S
Blooms: Jun. - Jul.
Full Sun - Part Shade
Water: Medium - Wet



Itea virginica
Virginia Sweetspire
3 - 5' H, 3 - 5' S
Blooms: Jun. - Jul.
Full Sun - Part Shade
Water: Medium - Wet



Kalmia latifolia
Mountain Laurel
5 - 15' H, 5 - 15' S
Blooms: May
Part Shade
Water: Medium



Lindera benzoin
Spicebush
6 - 12' H, 6 - 12' S
Blooms: Mar.
Full Sun - Part Shade
Water: Medium



Physocarpus opulifolius
Common Ninebark
5 - 8' H, 4 - 6' S
Blooms: May - Jun.
Full Sun - Part Shade
Water: Dry - Medium



Rosa carolina
Carolina Rose
3 - 6' H, 5 - 10' S
Blooms: May
Full Sun
Water: Medium - Wet

Figure 31: Shrub palette.

TREE PALETTE



Acer saccharum
Sugar Maple
40 - 80' H, 30 - 60' S
Blooms: April
Full Sun - Part Shade
Water: Medium



Aesculus glabra
Ohio Buckeye
20 - 40' H, 20 - 40' S
Blooms: Apr. - May
Full Sun - Part Shade
Water: Medium



Betula nigra
River Birch
40 - 70' H, 40 - 60' S
Blooms: Apr. - May
Full Sun - Part Shade
Water: Medium - Wet



Carya ovata
Shagbark Hickory
70 - 90' H, 50 - 70' S
Blooms: Apr. - May
Full Sun - Part Shade
Water: Medium



Cercis canadensis
Eastern Redbud
20 - 30' H, 25 - 35' S
Blooms: Apr.
Full Sun - Part Shade
Water: Medium



Cornus florida
Flowering Dogwood
15 - 30' H, 15 - 30' S
Blooms: Apr. - May
Part Shade - Full Shade
Water: Medium



Fagus grandifolia
American Beech
50 - 80' H, 40 - 80' S
Blooms: Apr. - May
Full Sun - Part Shade
Water: Medium



Liriodendron tulipifera
Tulip Tree
60 - 90' H, 30 - 50' S
Blooms: May - Jun.
Full Sun
Water: Medium



Liquidambar styraciflua
Sweetgum
60 - 80' H, 40 - 60' S
Blooms: Apr. - May
Full Sun - Part Shade
Water: Medium



Quercus alba
Northern White Oak
50 - 80' H, 50 - 80' S
Blooms: May
Full Sun
Water: Dry - Medium



Quercus rubra
Northern Red Oak
50 - 75' H, 50 - 75' S
Blooms: May
Full Sun
Water: Dry - Medium



Sassafras albidum
Sassafras
30 - 60' H, 25 - 40' S
Blooms: Apr. - May
Full Sun - Part Shade
Water: Medium

Figure 32: Tree palette.

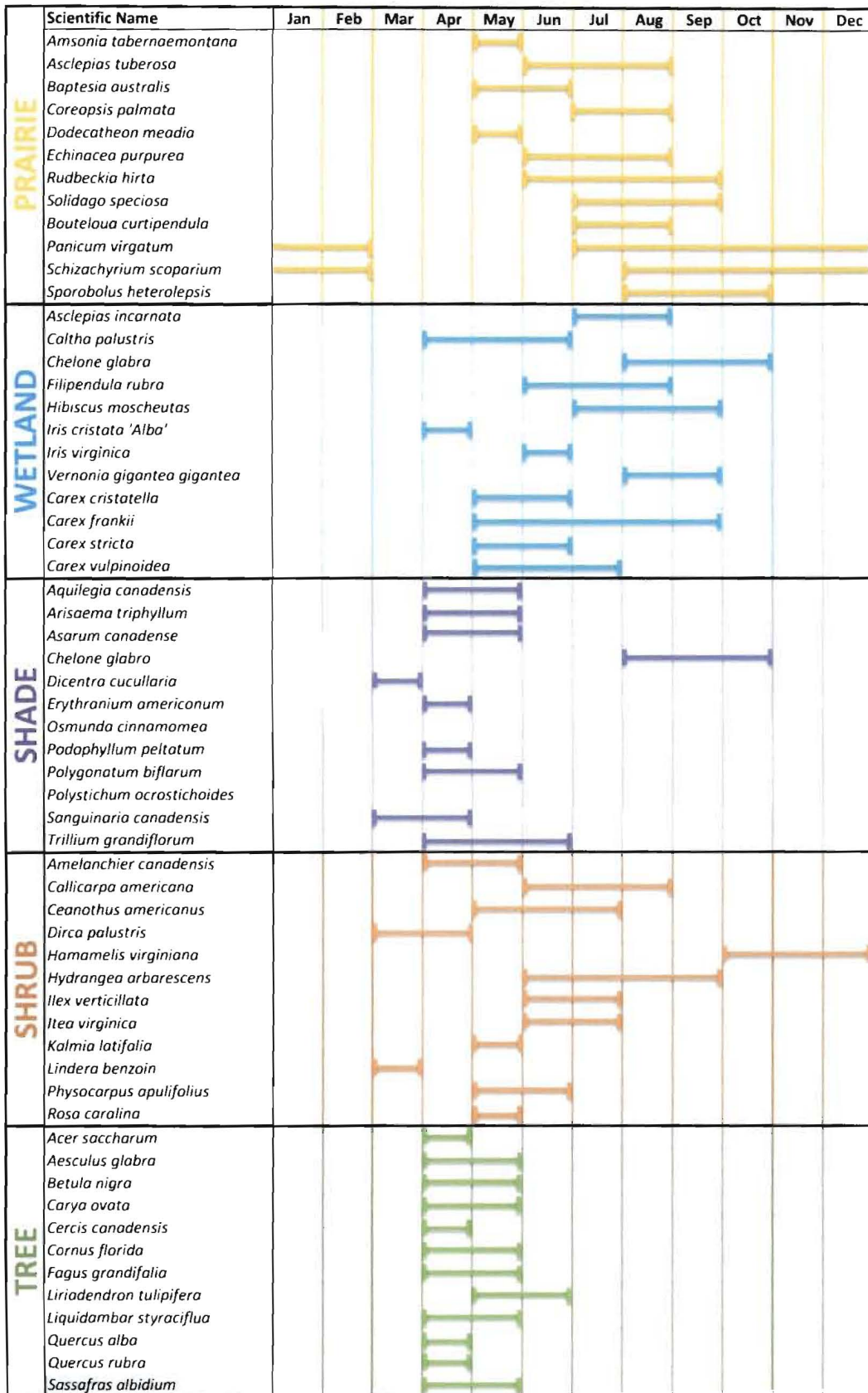


Figure 33: Bloom Schedule.

YELLOW BANK SITE RATIONALE

As stated in the Site Rationale on page 41, the Yellow Bank site posed many unique opportunities for development into a strong trailhead. Proximity to US 52 as well as to a variety of historic resources makes this site particularly well suited for a trailhead. This area previously consisted of a large gravel parking lot with poor drainage, storage for Moster Turf (a local business), and a native woodland.

By incorporating a full parking lot here for twenty-four vehicles, as well as four handicap-accessible spaces, visitors have plenty of room for gathering or simply parking to enjoy walking this segment of the Towpath Trail. A 24'-0" by 50'-0" restroom facility and pavilion area can be used for picnics, gatherings, educational demonstrations, and any variation of other activities that might occur in this history-rich area.

The history at the Yellow Bank Trailhead includes Lock 24, less than 775'-0" from the entrance to the parking lot, and an historic rail road bridge, built in 1907 by the King Bridge Company, a mere 380'-0" from the parking lot down the same trail. On the east side of the site, the old ice ponds are available for viewing. The shallow ponds were flooded and allowed to freeze, and large chunks of ice were cut and shipped via the canal and rail lines to Cincinnati and other towns along the canal corridor.

Ecological goals are met here with the incorporation of bioswales and trailside plantings. The inclusion of only native species ensures that the ecology of the site is restored to a more natural state. Native plantings provide food and shelter for local animals as well as cleanse stormwater from the parking lot and trail as well as from US 52.



Figure 34: Historic Rail Bridge at Yellow Bank.



Figure 35: Historic Lock at Yellow Bank.



Figure 36: Location.

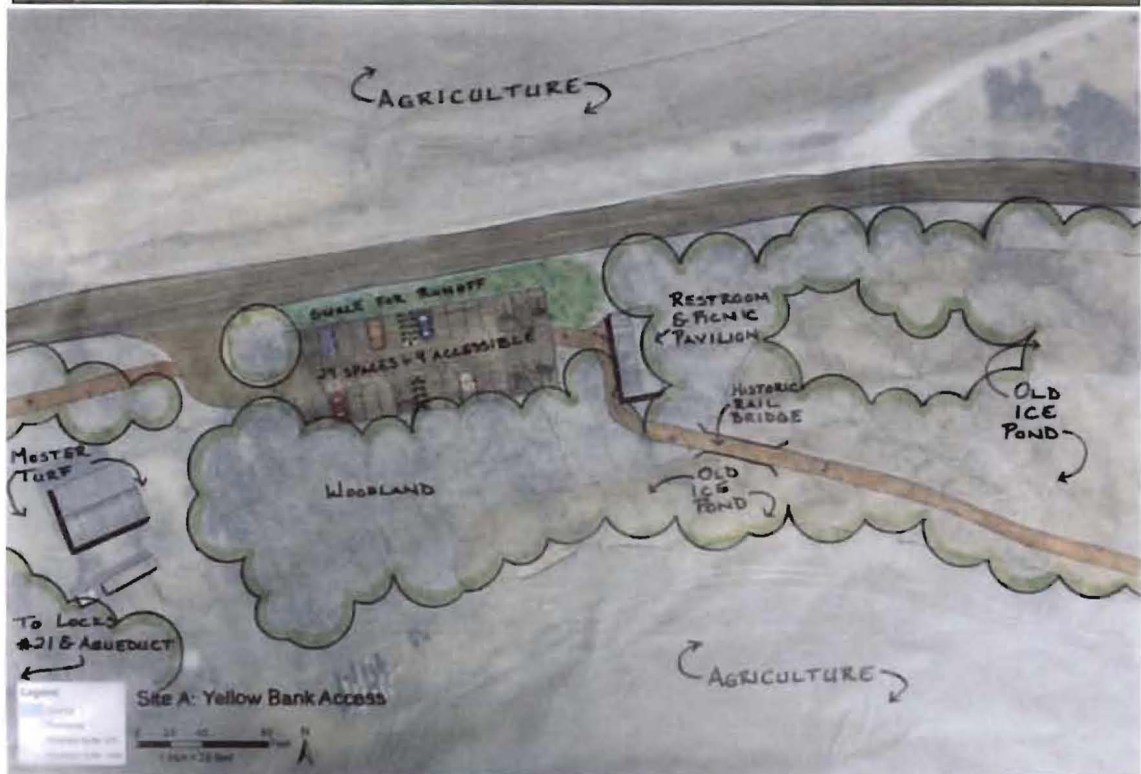


Figure 34 (above): Existing Conditions at Yellow Bank Site. Figure 35 (below): Proposal for Yellow Bank Site.



Figure 37: Parking and bioswale at Yellow Bank Trailhead.



Figure 38: Shelter and restrooms at Yellow Bank Trailhead.

CONCLUSION

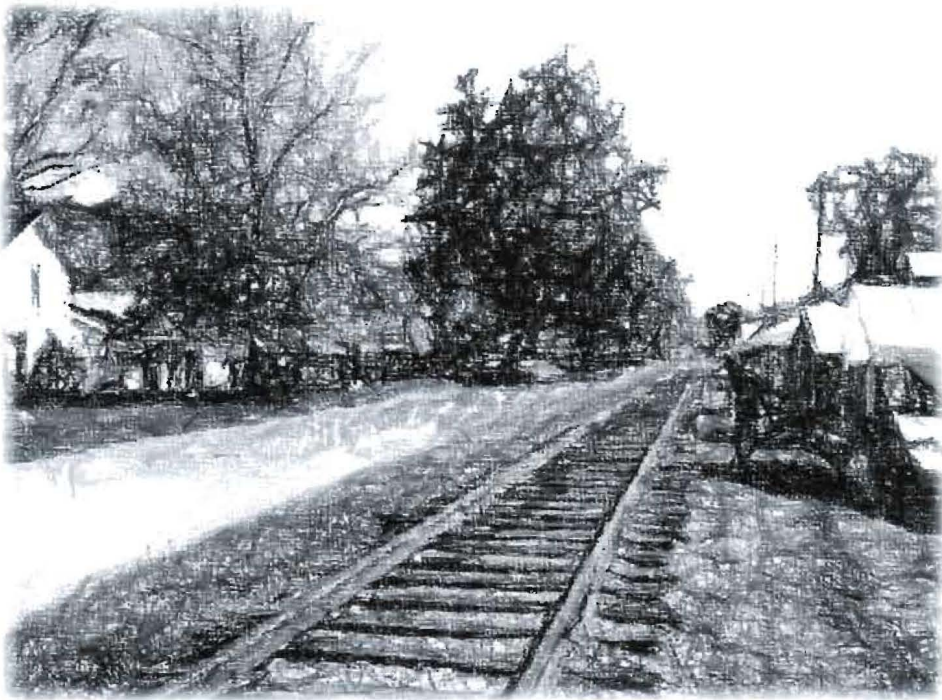
Throughout the process of this design, much has been discovered about the appropriate way to design rural greenways. Education and history can come alive in areas like this, presenting both the public and local schoolchildren with interesting tools for learning about their world. Adding exercise trails in the areas around people's homes can help to encourage a healthier lifestyle. Perhaps most importantly, the creation of a rural greenway in the areas around citizen's homes helps create places that connect on a deep level with their loyalty to a place and pride in their community, building a strong relationship between people and their land.

Encouraging citizens to explore the ecology of a place helps to tie them back to their surroundings. Providing for the natural functions of an ecosystem by allowing stormwater runoff to infiltrate a bioswale and percolate back into the soil shows visitors that the Towpath Trail is helping to keep the native ecosystem alive. The use of native plants also helps to establish areas for native plants and animals to thrive, and encourages new growth to maintain nativity as well by outcompeting invasive species.

History as portrayed through the use of trailside signage and interactive areas helps encourage people to reconnect with the past. Children and adults alike can benefit from seeing the workmanship of the Whitewater Canal and rail lines, as well as understanding the importance of these events on shaping the way Metamora and Brookville came to be what they are today.

Overall the Towpath Trail provides excellent opportunities for wildlife viewing, historical interaction, and exercise opportunities. This 8-mile-long trail in southeastern Indiana helps to not only reconnect the citizens with their heritage, but also to each other. Having places like this to interact in a casual way with your neighbors is vital to community health, and is something the world is greatly lacking in these days. The Towpath Trail helps to ensure that the current citizens and future generations will have respect for the land, their heritage, and their community.

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[APPENDICES]

APPENDIX A: BIBLIOGRAPHY

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